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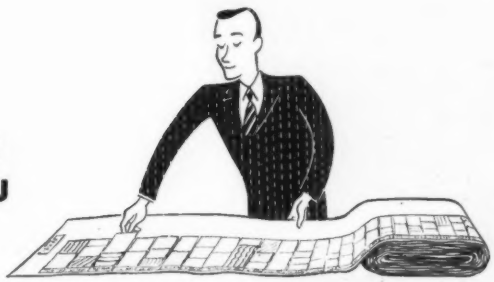
DYESTUFF REPORTER

E 17, 1946
IE 35, No. 12

HELPING US
TO HELP YOU



A visual history of a dye

Among the data on file in the Du Pont Laboratories are the color-fastness "blankets" —some "blankets" recording as many as 200 different tests on a particular dye. From these "blankets" we are able to give you accurate and complete data concerning each dye: what it will do when applied to different fibers; its degree of fastness; how it will perform.

For dependable dyes that will fit your job —and for reliable advice concerning their application—call on Du Pont.

DU PONT
REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING...*THROUGH CHEMISTRY*

Du Pont Dyestuffs

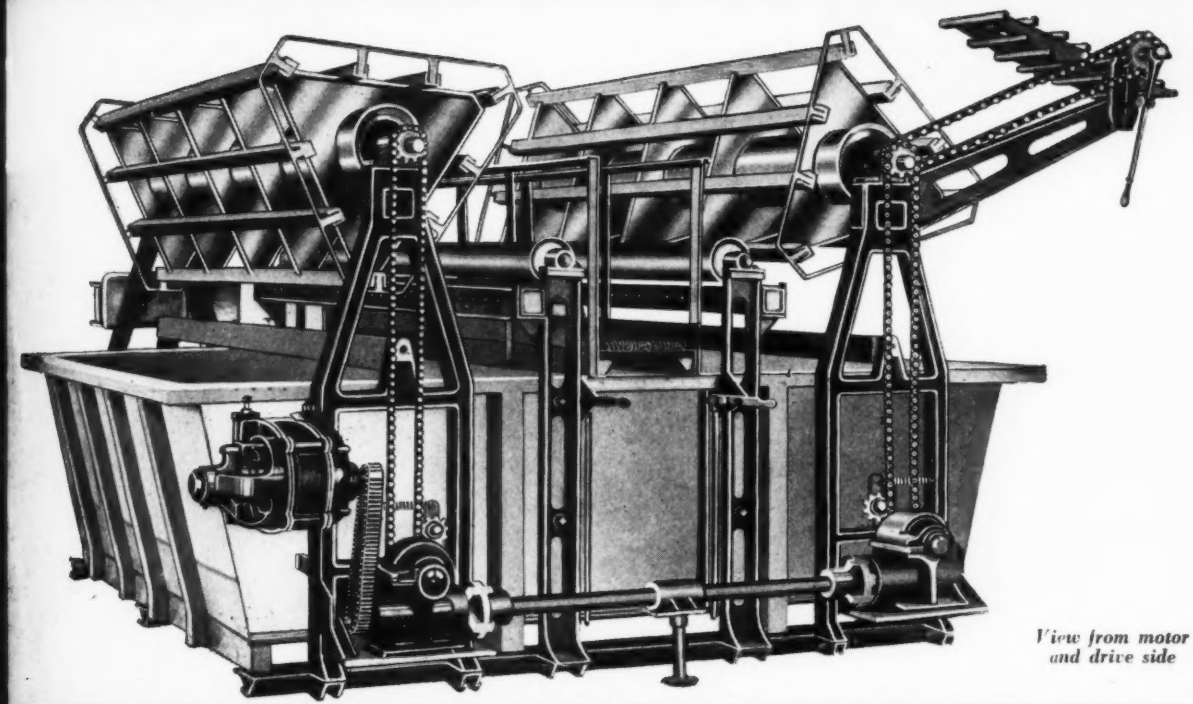
FORMASETS

Formasets, synthetic resin finishes for textiles, are again available without restriction. Several new types developed as a result of Warwick's war-time research have been added. Each Formaset has its particular advantages designed to solve specific finishing problems. Warwick technical advisors will gladly work with you in determining the correct Formaset for your needs.

WARWICK CHEMICAL COMPANY

A Division of Sun Chemical Corporation

580 FIFTH AVENUE, NEW YORK 19, N. Y.



View from motor and drive side

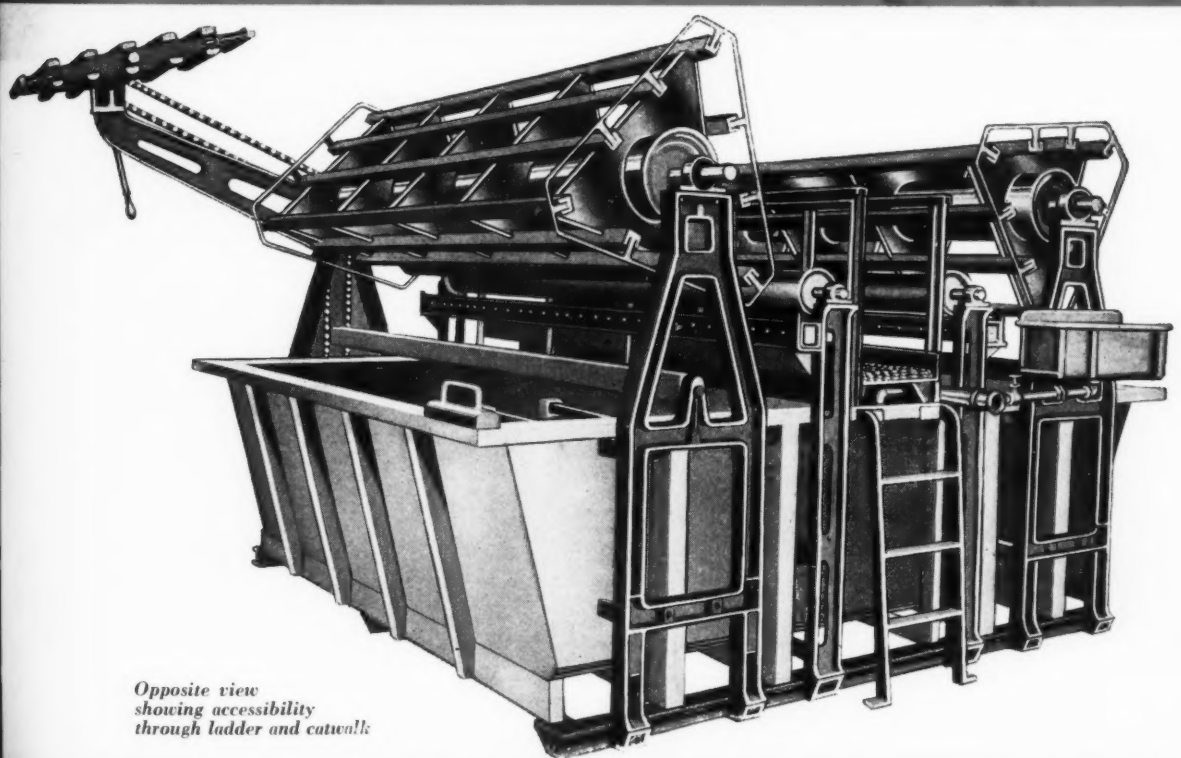
VAN VLAANDEREN *Duplex Reel* DYEING MACHINE

This patented Dyeing Machine is specially designed to do continuous strand form piece dyeing and will accommodate all qualities of goods from lingerie sheers to heavy dress fabrics. It is a decided improvement over the conventional type dyeing machine. It incorporates features, exclusive with Van Vlaanderen Wet Processing Machines, that have proven their practical operation over a period of years.

Built to the accepted *Van Vlaanderen* standard of ruggedness, this machine is available with stainless steel tubs or with hardwood tubs. The reels are of stainless steel as well as all parts of the machine that come in contact with the dye liquid. Write for new folder giving full information.

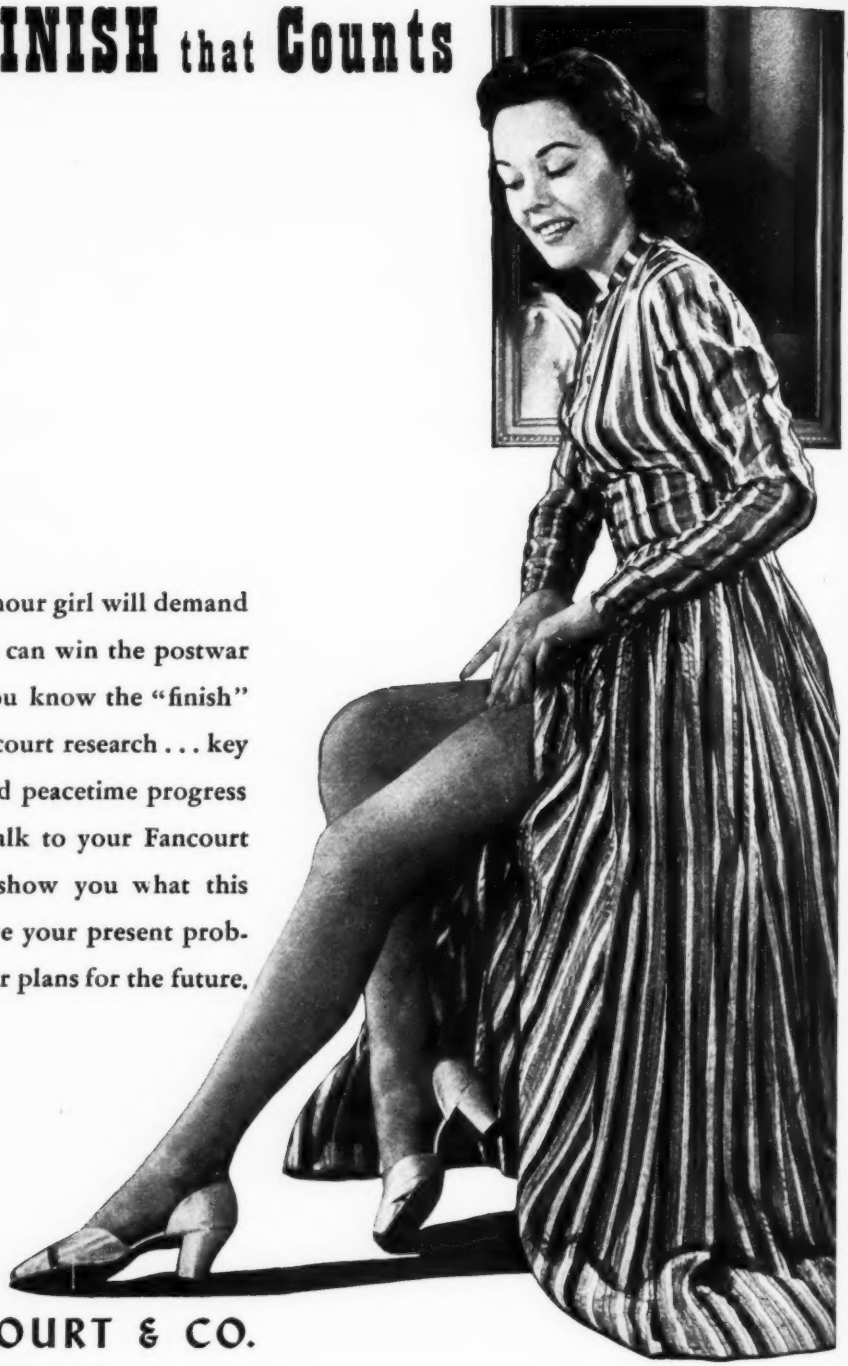
VAN VLAANDEREN MACHINE COMPANY, 370 Straight Street, Paterson 3, New Jersey

World's largest manufacturer of machines for processing modern fabrics



Opposite view showing accessibility through ladder and catwalk

It's the FINISH that Counts



● Miss Postwar Glamour girl will demand the best . . . and you can win the postwar hosiery business if you know the "finish" before you start. Fancourt research . . . key to wartime power and peacetime progress can help you now. Talk to your Fancourt Field man, let him show you what this service can do to solve your present problems and to build your plans for the future.

W. F. FANCOURT & CO.

PHILADELPHIA, PA.

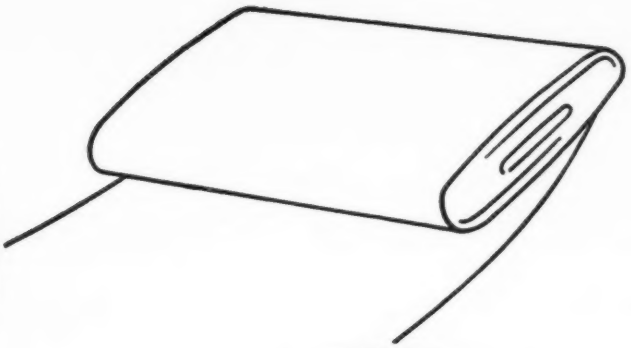
In the South, Howard A. Virkler, Greensboro, N. C.

WIN the Postwar Race . . . . . .
Know the "FINISH" Before you Start

Solving Finishing Problems Since 1904

American Dyestuff Reporter, Vol. 35, No. 12, June 17, 1946. Published every other Monday. Copyright 1946, by Howes Publishing Co., One Madison Ave., New York 10, N. Y. Domestic subscriptions, $5.00; Canadian, $6.00; Foreign, $6.00. Entered as second-class matter, Nov. 6, 1919, at the New York, N. Y., Post Office, under the act of March 3, 1879.

Regardless of the Fibre you Handle



...Bleach it with BECCO Hydrogen Peroxide!

Whether you bleach your goods in kiers, in package or other machines, by the cold bleach or by continuous steam bleaching methods, Becco Hydrogen Peroxide is the ideal bleaching agent. This is true whether you handle cotton, wool, knit goods, rayon or other natural and synthetic fibres.

And remember that Becco Hydrogen Peroxide is very easy to handle. It is shipped in drums or tank cars. It can be pumped or automatically fed to the point of use. This is especially important for efficient continuous bleaching operation.

Why not take advantage of Becco's many years of specialized bleaching experience? Ask our engineers and chemists to advise you what system is most suitable for processing your goods, regardless of the type of fibre used. This bleaching "know-how" can now be yours, free. Write to

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Eternalure

RESIN FINISHES

Increased Snag Resistance and Improved Body for *Nylons*

YOU can greatly improve appearance and wear of your nylon hosiery by using the combination of **ETERNALURE DB and 25** recommended for each particular gauge and thread.

Eternalure Resin Finishes are water dispersions of insoluble resins, especially developed for finishing nylon hose. They tighten and clarify the stitch. Body is improved and snag resistance materially increased. All effects are *permanent* and will not wash out!

Better Hand . . . Minimum Irregulars—Hose finished with Eternalure DB (for dulling and increased snag resistance) and Eternalure 25 (for improved body and better snag resistance) has a greatly improved hand. More—it can be handled with a minimum of irregulars.

Easy to Use—You don't have to modify your equipment or operations. Use Eternalure in rotary or paddle machines just as you apply ordinary finishes. Eternalure involves no hazards of toxicity or inflammability.

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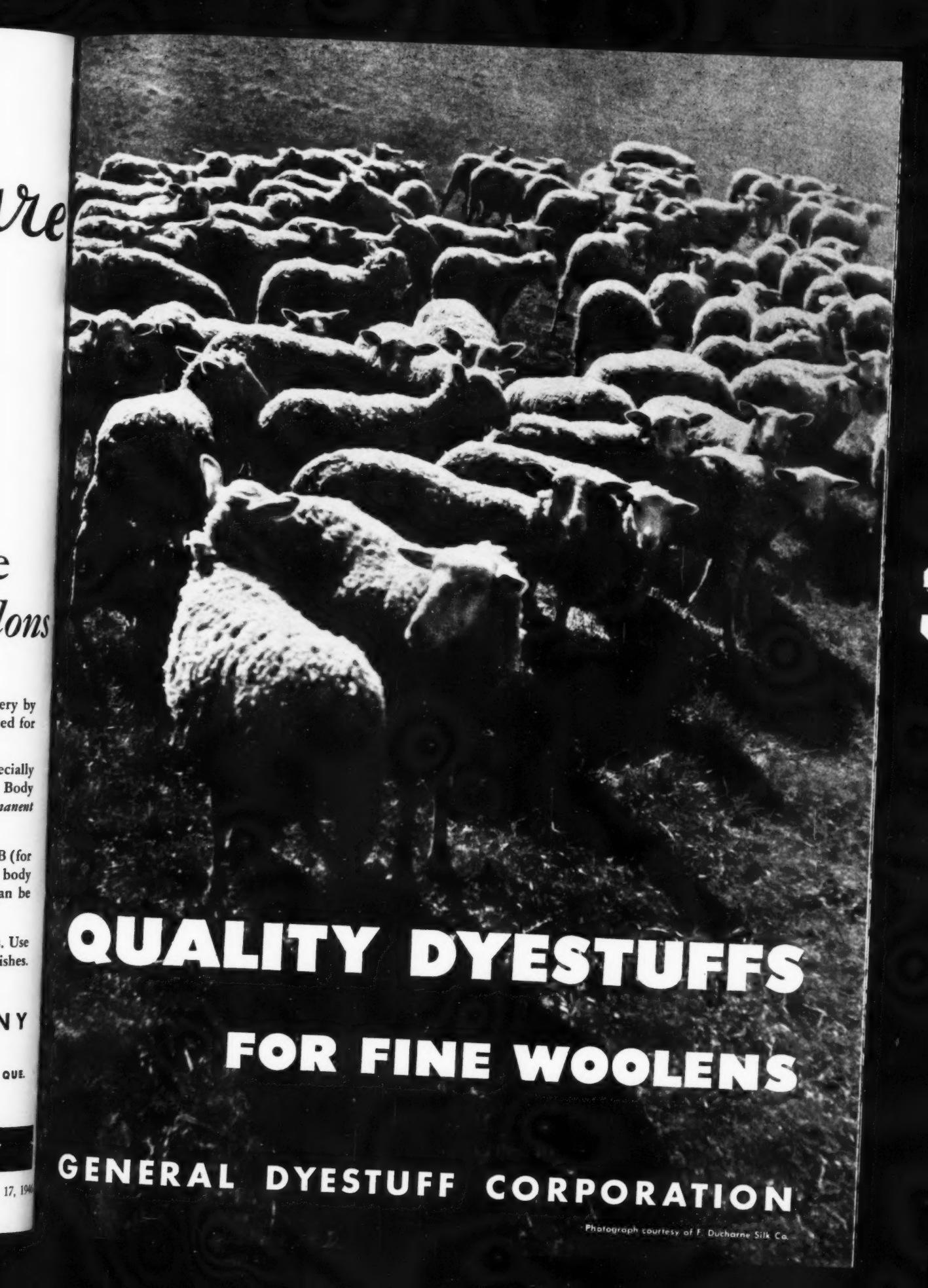
onyx RESIN FINISHES FOR HOSIERY


QUALITY DYESTUFFS
FOR FINE WOOLENS
GENERAL DYESTUFF CORPORATION
Photograph courtesy of F. Ducharne Silk Co.

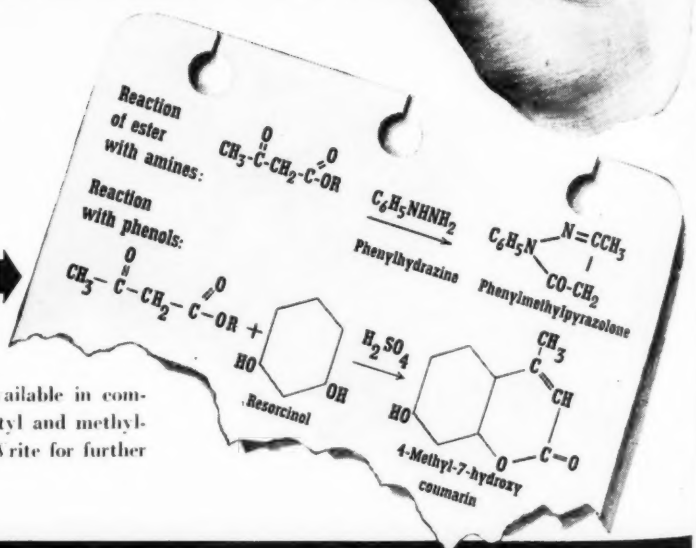
Chemicals of New Industrial Importance

Acetoacetic Esters for

Dyes & Pigments
Pharmaceuticals
Stabilizers
Sun-Screens

$$CH_3-\overset{OH}{\overset{|}{C}}=CH-\overset{O}{\overset{\|}{C}}-O-R$$

The highly reactive acetoacetic esters, long a favorite of organic chemistry professors, have assumed a new importance in modern industry. Two reactions which indicate the many possibilities of these compounds in organic synthesis are shown here.



Both methyl and ethyl acetoacetate are available in commercial quantities. Other esters, such as butyl and methyl-amyl can be supplied in research amounts. Write for further information.

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QUALITY CHEMICALS FOR EVERY PHASE OF TEXTILE PROCESSING

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For a quarter of a century, outstanding textile mills have standardized their wet processing operations with HARTEX chemicals. HARTEX research, keeping pace with the latest development, has met every changing requirement of the textile industry. Always—all ways—Hart Products have done their job in rendering an efficient service to the textile industry.

If you have a processing problem—let Hart research give you the benefit of this long mill experience. Write today for full information on Hartex Products or send for a Hartex Specialist to go over processing problems with you.

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Hart Products

based on research

3 case histories

of trouble with woolen materials

CASE 1

A manufacturer of woolen and worsted yarn found that pastel shades were coming up dull and off-shade. His chemist attributed this to iron in the water supply—a diagnosis which was confirmed when the Calgon man found that the water contained 0.1 ppm of iron on leaving the softener, but 2.0 ppm when it reached the dye house.

The Cure

"Threshold Treatment" of the water supply, adding 4 ppm of Calgon* brought iron content of water at the dye house down to 0.1 ppm and shades came up with the desired brightness.

CASE 2

Streaks in dyed goods became a serious problem in a New York woolen mill. Analysis of the fabric showed that a mineral oil was causing this condition. This was traced back to a substitute oil used for oiling the yarns, which was not removed in the scour.

The Cure

Calgon was added to the scour, and the trouble was ended immediately.

CASE 3

In a woolen mill in the middle West, blankets developed a rancid odor. Analysis showed that this odor was due to the presence of lime soap which could not be removed by the regular rinse.

The Cure

Addition of Calgon in the scour prevented the formation of lime soap, and Calgon in the rinse prevented further precipitation of soap during this operation. The rancid odors were eliminated.

For full information about the many applications of Calgon in the textile industry, write for Technical Bulletin No. 3, "Calgon Data for the Textile Chemist." We will be glad to send you a copy.

** T. M. Reg. U. S. Pat. Off.*

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QUALITY DYESTUFFS

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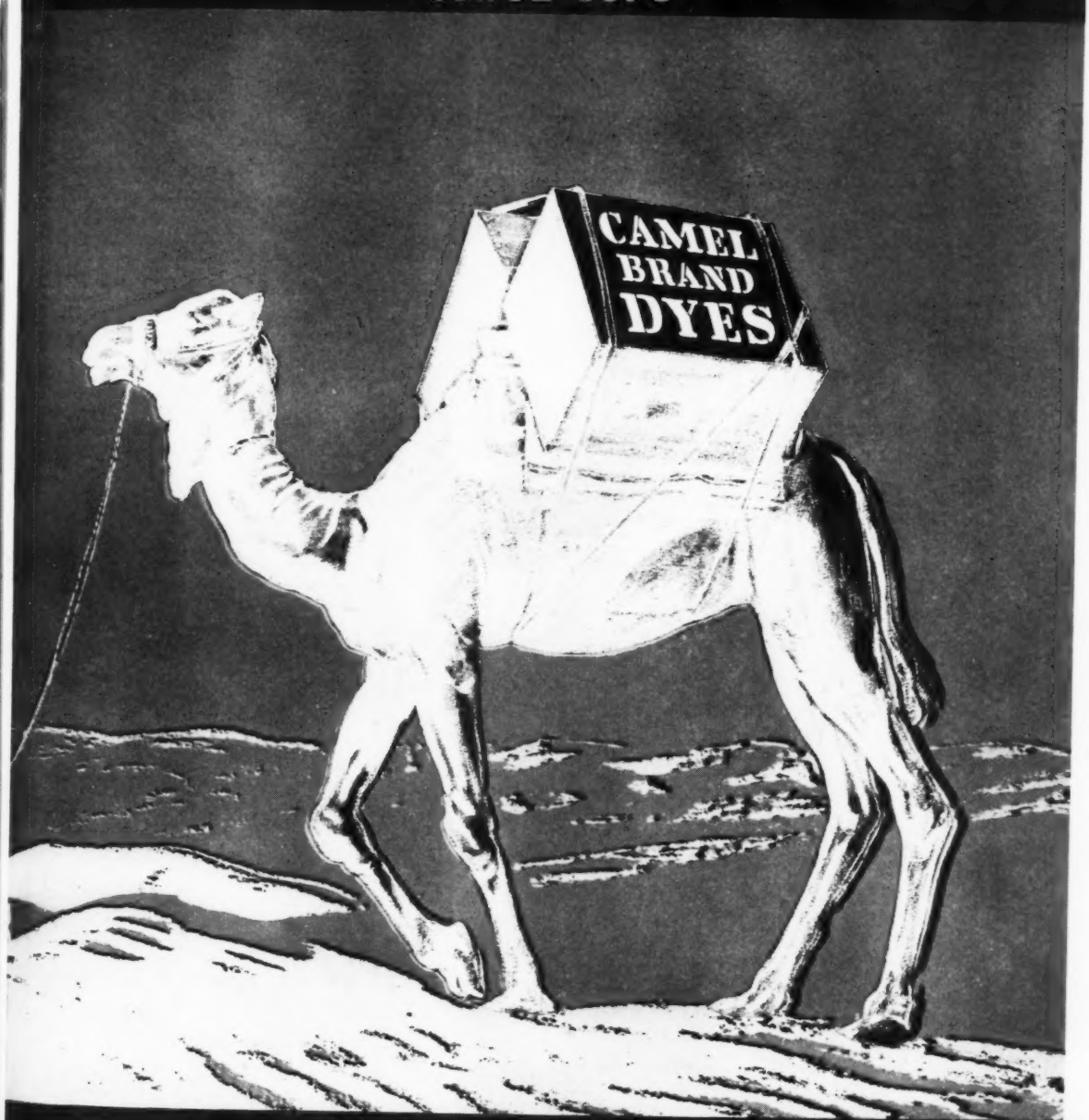

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Mill men know that to specify Aquarol is to assure high water-repellent efficiency for overcoatings, ski suits, sport jackets and slacks and all kinds of rainwear fabrics.

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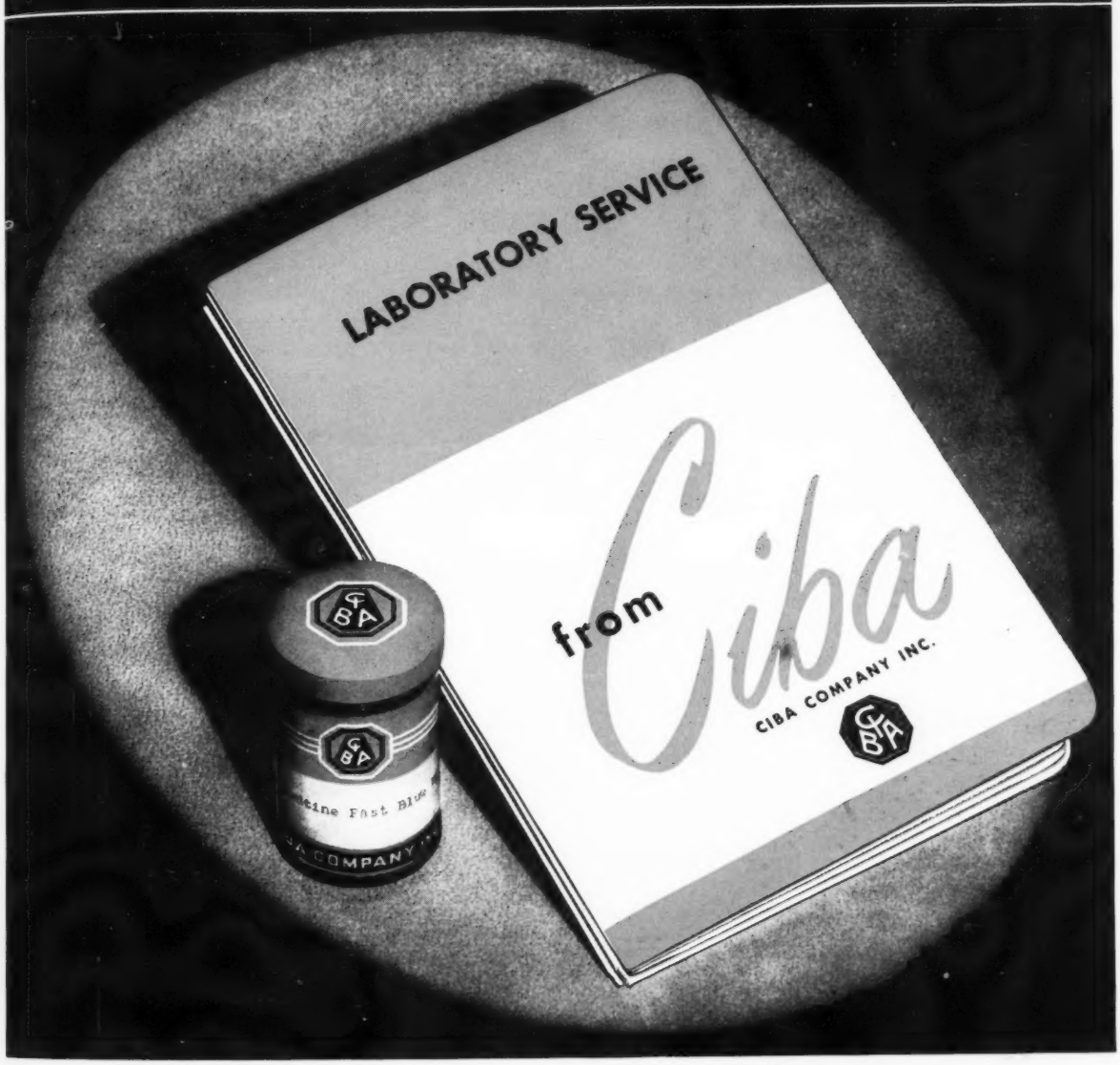

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Greatly expanded use of sheer fabrics is now being created by SHEERSET† RESIN, a combination of resins based on melamine, which imparts lasting crispness and color stabilization.

SHEERSET RESIN can be applied to cotton, rayon and acetate sheer woven fabrics and mixtures as a wash-resistant, crisp resilient finish. If desired, pigment colors may be incorporated in the impregnation bath to obtain colored effects which are fast to light and washing.

Sheer fabrics manufacturers seeking ways to endow *their* textiles with new sales features, will do well to investigate SHEERSET RESIN *today*. Our technical staff will be glad to advise you on its use for best results.

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LACET† RESIN *AEROTEX† SOFTENER H*

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IT IS AVAILABLE

Textile Oil #522 represents a skillfully refined and deodorized dyeing and finishing oil in many ways superior to old-fashioned sulfated castor oil. Its non-tackiness permits its use not only for dyeing, but also for the finishing of cottons, rayons, mixtures, etc.

No odor • No discoloration • No tackiness

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Crumple a piece of Olate-processed woolen fabric in your hand. Note its resilience . . . its soft, lofty feel . . . its clothy hand.

That's the kind of fabric you can expect when you full and scour woolens with this pure, neutral, low titer soap.

Several Olate characteristics contribute to its excellent processing results. For example, Olate's low titer and thin flake form give you fluid solutions which penetrate fibers quickly, thoroughly and uniformly. Olate disperses lime soaps into finely divided particles which do not adhere readily to woolen fibers. Olate rinses freely.

On the score of efficiency, safety, speed, and economy, Olate bows to no other soap for good processing results. Olate can help *your* mill turn out the maximum in saleable fabrics. Try it.

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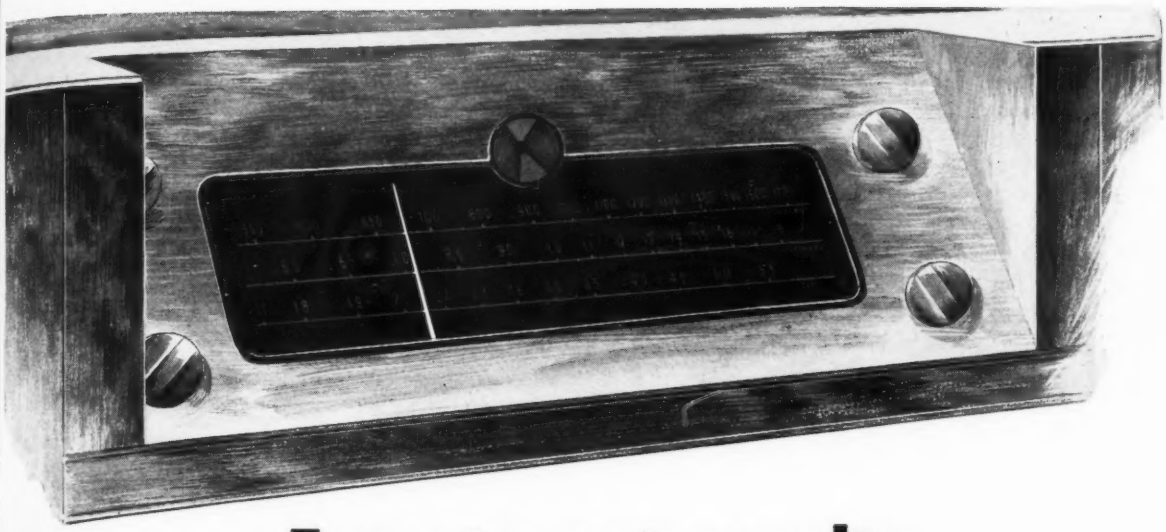
Olate—safe and efficient for every textile soap usage!



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with DIASTAFOR

de-sizing agent

Type L is an all-purpose de-sizing agent which works smoothly in wide ranges of temperature and pH

DE-SIZING can be as simple as tuning your radio if you use Diastafor, the all-purpose de-sizing agent.

That's true even when sizing formulas contain many different ingredients. If you knew all the ingredients other than starch, your de-sizing problems would be simple. But when most every lot employs a different warp sizing you need a de-sizing agent that will work in a wide range of temperatures and pH: Diastafor—Type L.

When you use Diastafor the results prove its quality throughout your bleaching and dyeing operations. You get a fine, soft, slinky "feel" in your finished goods, whether cotton, or rayon, or mixtures; dyeing is even and unshaded—no streaks, no blemishes.

Diastafor brand de-sizing agents come in various types—one to meet every problem. Diastafor's 38 years of leadership have been earned not only by giving you more enzymes per dollar, but by supplying a product that is as nearly foolproof as we know how to make it.

If you have a de-sizing problem we would welcome the opportunity of assisting you to get results quickly and economically. Our sales and technical staffs are at your service. Address your communication to Standard Brands Incorporated, *Diastafor Division*, 595 Madison Avenue, New York 22, N. Y.

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A TRADE MARK OF STANDARD BRANDS

For a filament acetate size with HIGH LOOM EFFICIENCY

Try CETASIZE

This high quality protein powder also offers these 6 ADDITIONAL ADVANTAGES

OUR LINE OF TEXTILE STARCHES GUMS, DEXTRINES AND SPECIALTY MATERIALS ALSO INCLUDES:

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For sizing staple synthetic yarns and blends.

RTF GUM
For laundry resistant finishes

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For use in printing . . . higher color yield.

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For starchless finishes.

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For pigment printing and pigment dyeing in water dispersions . . . excellent wash fastness.

1. Complete uniform product.
2. Size easily removed.
3. Runs clean on the machine—no foam.
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5. Easily prepared.
6. Replaces other sizing materials which may be difficult to obtain.

An increasing number of plants are enjoying these values in their regular production. Whether you're weaving rayon now or planning to weave it, prove for yourself that CETASIZE is the answer to your filament acetate warp sizing problem.

ORDER A SAMPLE TODAY—
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80 YEARS OF SERVICE TO THE TEXTILE INDUSTRY

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Though few can custom-blend textiles and leathers into one harmonious creation, every woman visions her next ensemble as the perfect symphony of color. And shops weary miles to give her dream reality.
National Aniline, sole American producer of every class of aniline dye and color, has an intimate knowledge of the inter-related color problems of the textile, leather, cosmetics and the accessories fields. This unduplicated experience is yours through nearby National Technical Service.
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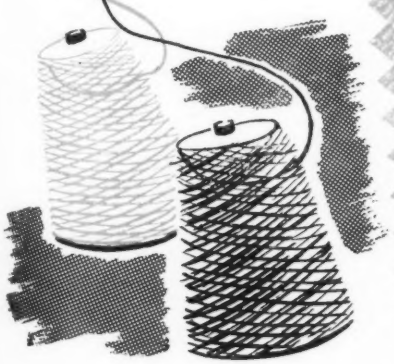
STATIC INHIBITOR

STANTEX #629 varies considerably from the majority of so-called anti-static agents since most other electrolytes, which are used to prevent static, degrade the running properties of the yarn by increasing running tensions, resulting in poor winding, broken filaments and fuzziness.

STANTEX #629 reduces static and, at the same time, imparts soft finishing properties to fibers and yarns, increases pliability filament protecting properties, reduces fly waste and is easily removed from yarns. Stock or staple treated with STANTEX #629 produces increased lengths of lap with higher breaking strength.

STANTEX #629 is used on nylon, rayon, acetate, cotton and wool. It can be applied as a spray on raw stock and staple used in sizing, coning and also as a finish.



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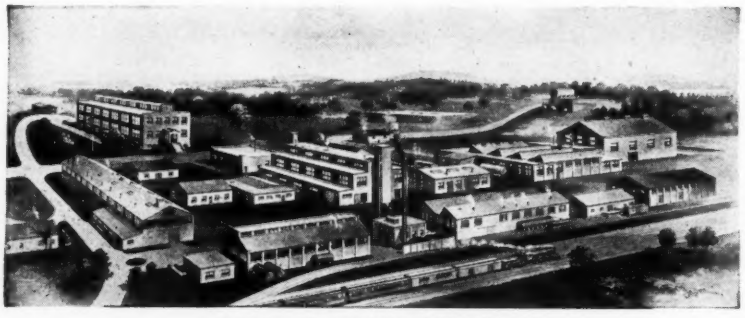
FINISHING MATERIALS

FOR

WOOL — COTTON — RAYON — ACETATE

AND MIXED FIBERS



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each a Masterpiece

VELVAMINE K-90

An improved softening and finishing agent for use on all types of fabrics. It imparts an odorless finish which is resistant to washing and dry cleaning. Can be used as a substitute for sulphonated oils, tallows and other softeners. Its use eliminates yellowing and rancidity often encountered with the usual fatty type of softening agents.

PERMALENE SOL

A penetrant and cleanser designed for use on all fabrics especially those that are tightly woven and highly twisted. Recommended for pad-dyeing where it insures uniform and thorough penetration. It is of great assistance where low temperature dyeings are necessary. Non-foaming at high speeds, it is stable in neutral, alkaline and acid solutions.

VELVAMINE GF

Velvamine GF is a blend of amines and softeners designed to protect acetate colors from gas or fume fading. It resists removal by drycleaning and, when used on mixed fabrics, has a minimum effect on the shade and light fastness of the direct colors.

Velvamine GF produces a soft, full hand and does not affect the appearance of the treated fabrics.

PERMALENE WS

A white powder soluble in water at 80° F. Capable of dispersing iron, calcium and magnesium salts and redissolving or redispersing precipitated compounds of these metals. It is so highly buffered that the pH of its solution is practically independent of its concentration.

REFINED PRODUCTS COMPANY

Lyndhurst • New Jersey

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CLARENCE E. MOSS, 19 Wilson Ave., Rumford (16) R. I.

The FACTS Behind the Glycerine Shortage

AS everybody knows, the war and the widespread disruptions following it have caused a serious world-wide shortage of fats and oils, from which glycerine is derived.

This is the reason why enough glycerine cannot be produced at present to supply immediately all the heavy demands of the reconversion period.

Just as bread is short because of the world-wide shortage of wheat so, temporarily, the full demand for glycerine cannot be supplied because of the shortage of fats and oils.

As this situation gradually corrects itself, glycerine will be in good supply again and fully at your service.

GLYCERINE PRODUCERS' ASSOCIATION

295 Madison Ave., New York 17, N. Y. *Research Headquarters, Chicago, Ill.*

How would YOU print this pattern?

This design, printed on rayon crepe dress goods, was produced by the *Apponaug Company* for *Arthur Beir & Co.*, well-known converter of high quality cotton and rayon fabrics.

Here's how it was done:

1. The light blue ground was dyed in the usual manner with direct colors.
2. The white discharge was obtained by printing with Aridye* White F2L cut 1:5 with Aridye Clear containing 12 oz. per gal. sulfoxylate.
3. The gray was overprinted, using 2 parts Aridye Black FK and 1 part Aridye Blue FC2G, cut 1:48.
4. The outline was printed with aniline black using a starch and gum thickener.
5. After printing, the fabric was dried, padded with peroxide, steam aged, washed.

Note particularly, the fine details of the feathery edging, the close registration and the complete absence of halo. Only by the use of Aridye Pigment Colors could these results have been obtained in printing this unusually striking floral design.

It is because of their excellent printing qualities, ease of application and exceptional fastness to sunlight and washing that Aridye Pigment Colors, alone or in combination with other dyestuffs, are being used more and more by such foremost printers of fine cottons and rayons as the Apponaug Company.

The pattern shown here is but one of many examples of the unusual effects which are easy to obtain with Aridye Pigment Colors, but difficult to produce by conventional methods. It is by no means an exception. For Aridye Colors also offer you many definite advantages when used in your everyday dyeing and printing jobs.

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ANOTHER DAN RIVER RESEARCH PROCESS

PROCESS OF TREATING TEXTILE MATERIALS

United States Patent No. 2,334,199
Issued to Harley Y. Jennings, Nov. 16, 1943
(Also Known as Resin-Pigment Dyeing Process)

This is an improvement on the Bartell Patent, No. 2,097,012, both processes being controlled by Riverside & Dan River Cotton Mills, Inc., Danville, Virginia.

THE INVENTION AND ITS OBJECT

For the information of the textile industry, and particularly for the information of those units of the industry engaged in the coloring and dyeing of textile materials, we quote, in part, from the patent papers, as follows:

"This invention relates to processes of treating textile materials and particularly to the art of coloring textile fibers and objects made from such fibers.

"The invention contemplates the fixing or setting of a dyestuff on a fabric or textile material by means of a water-insoluble resinous substance which substance is dissolved in a suitable solvent. The dyestuff used may likewise be soluble in the solvent for the resin or it may comprise an insoluble pigment, but in any event it should be water-insoluble.

"In order to insure a maximum degree of penetration and to use a minimum amount of solvent, the invention contemplates the formation of an oil-in-water emulsion in which a solvent containing dissolved resin and coloring matter constitutes the inside or disperse phase. In order to form an emulsion of this type, the solvent used should be insoluble in water.

"A sufficient quantity of water is used to make the emulsion relatively thin, so that the fabric or other material to be dyed may be passed through a padding bath comprising the oil-in-water emulsion. In passing through the bath the fabric, because it is more readily wet by the organic solvent than by the water, is penetrated by the solvent droplets containing the dissolved resinous substance and coloring matter and is then dried, leaving a film of coloring matter and resinous substance around the individual fibers which comprise the textile material. The resinous substance serves not only to bind the coloring matter to the fibers in a smooth substantially continuous film, but also serves as a finish for the treated material, so that I accomplish the usual dyeing and finishing steps in a single operation with a resultant saving in time and labor.

"By a judicious selection of resins the finish so applied may be permanent as regards washing and dry cleaning with the usual solvents, and may also impart added wear to the fabric, by offering an additional surface against abrasive wear.

"As both the resinous substances and the coloring matter are water-insoluble, the treated material may be subjected to repeated washings without affecting the 'hand' or appearance of the material. The coloring matter, bound to the material by or as a part of the dry film of resinous substances, is fast and permanent."

Claims Nos. 2, 3 and 4 are quoted by way of example, of the six claims of this patent, as follows:

2. "A solid-colored textile material comprising a fabric having discrete fibers, and means substantially covering the discrete fibers to color the same, said means comprising a thin substantially continuous film of resinous substance containing coloring matter, the material being, to the naked eye, of a uniform color and appearance, substantially identical with the product of claim 4.

3. "The art of treating textile materials having discrete fibers which comprises dissolving a water-insoluble resinous substance and an oil-soluble dye in a volatile organic solvent, incorporating in such solution water to produce a relatively fine oil-in-water type emulsion in which the tiny droplets of organic solvent containing dissolved resinous substances and dye comprise the disperse phase, the consistency of the solution being such that the liquid will enter the capillary spaces of the textile material, subjecting the material to said emulsion whereby the droplets of organic solvent containing dissolved resinous substance and dye are absorbed by the textile material due to the high affinity of the organic solvent for the textile material, and then evaporating the organic solvent to leave the resinous substance and dye as a thin film on the discrete fibers of the textile material.

4. "The art of treating porous textile materials having discrete fibers comprising as a step, applying to discrete fibers of the structural yarns of the fabrics an aqueous dispersion of water-insoluble resin, water-insoluble coloring matter and water-insoluble organic solvent for the resin, the consistency of the dispersion being so thin as to leave said interstices open, the organic solvent being of a nature as to carry the dispersed resins and coloring matter into the capillary spaces of the material, and drying the material to leave a thin coating of resin and coloring matter around the discrete fibers without materially affecting the porosity of the material."

STATUS OF THE INVENTION DURING THE WAR PERIOD

Under the contract entered into by Riverside & Dan River Cotton Mills, Inc., with the United States Government during the period of the late war, the patent herein referred to was specifically designated by its number (2,334,199) as being among those to which Riverside & Dan River Cotton Mills, Inc., granted "releases and royalty-free licenses to the Government to practice the inventions secured by their patents and applications for patents."

Hence, during the period of the war, the assignee of this patent, Riverside & Dan River Cotton Mills, Inc., gave no public notice of its exclusive rights to this process.

By its terms this contract with the Government terminated "on the date six months after the cessation of hostilities in all wars in which the United States is now engaged." Accordingly, this contract with the Government expired as of March 2, 1946.

LICENSING AGREEMENTS

Upon expiration of this contract, Riverside & Dan River Cotton Mills, Inc., proceeded forthwith to make available to the industry Licensing Agreements under the terms of which Licensees will be enabled to enjoy all the benefits of this invention equally with Riverside & Dan River Cotton Mills, Inc.

Information as to these licensing agreements may be obtained from

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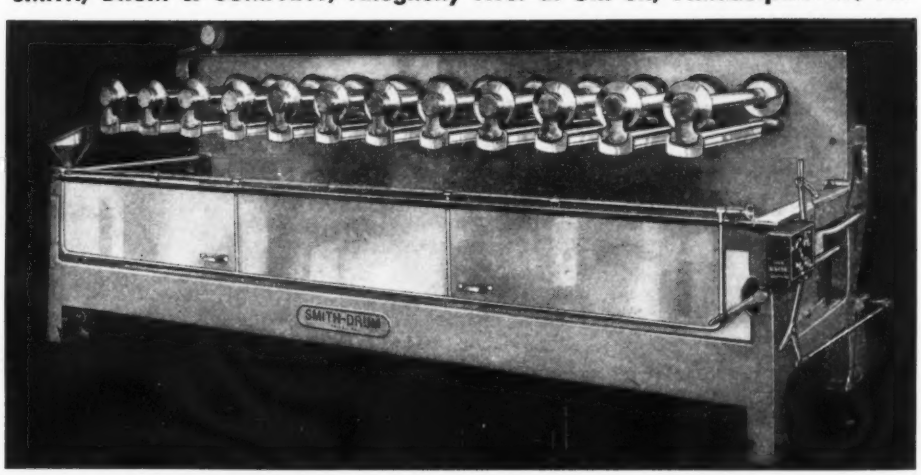

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JUNE 17, 1946

VOLUME 35 NUMBER 12

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VOLUME 35 JUNE 17, 1946 NUMBER 12

A DROP-PENETRATION APPARATUS for Evaluating WATER REPELLENT FABRICS*

ARNOLD M. SOOKNE[a], FRANCIS W. MINOR[a], J. E. SIMPSON[b] and MILTON HARRIS

I. INTRODUCTION

ALTHOUGH water repellent fabrics have been used in clothing for many years, their production and use received considerable impetus during the war. Such materials have a great advantage over waterproof fabrics, particularly for military applications, in that they are permeable to air and water vapor. They thus permit effective evaporation of perspiration, at least when it is not raining,[1] while they act as a barrier to penetration of water during rainfall. One of the principal difficulties in the development of water repellent fabrics has been the lack of suitable methods for testing them—particularly methods that simulate and bear a relationship to the effect of natural rainfall.

The tests designed to evaluate water repellent treatments, or fabrics suitable for such treatments, are very numerous and consist of several types. They may be classified into three different categories:

(1) Those which evaluate the finish (spray, absorption, and contact angle tests).

(2) Those which evaluate principally the fabric structure (air permeability tests).

(3) Tests which evaluate both the fabric and finish (hydrostatic pressure, water permeability, and penetration tests).

Experience has shown that no one type of test yields complete information concerning the water repellency of a fabric. It is certainly necessary and desirable under some circumstances to measure the effectiveness of a finish, per se, or to test a given untreated fabric for its suitability for use in a water repellent garment. Such tests are of particular importance for control during the manufacturing and finishing processes. However, the most obvious and important requirement of a water repellent fabric is, in general, its ability to keep the wearer dry in the rain, and this property is a function of both the fabric and finish. While tests that measure water permeability or resistance to hydrostatic pressure are affected by both fabric and finish, they lack the dynamic feature inherent in rainfall, and it will be shown below that such tests can be very misleading in evaluating the resistance to rainfall afforded by any given fabric. Tests that involve the impingement of water against a fabric more closely simulate the action of rainfall, and may therefore be expected to provide a more reliable indication of the service performance of a finished fabric. Tests of this type have also been numerous, and include the use of sprays, streams and drops. The Bundesmann tester (1), which permits falling drops to impinge on a fabric, has probably found the widest use in Europe. In this country, the du Pont Rain Tester (2), which uses streams of water produced by a nozzle, has perhaps found the widest application. The latter apparatus was developed by Slowinske, who has contributed much to the intelligent evaluation of water repellent fabrics.

In January, 1943, an investigation of methods for the evaluation of water repellent fabrics was undertaken at the request of the Office of the Quartermaster General.[2] It was recognized early in this investigation that a method of testing resistance to rainfall, preferably one that utilized the effect of falling drops, would be very desirable. Of the several devices that have been used for this purpose, the Bundesmann tester (1) appears to be the most suitable. In contrast with many of the other devices of this type, the Bundesmann apparatus includes provision for measuring the amount of water that penetrates the sample, and it subjects the sample to falling drops from a large number of sources, rather than from a single source. However, it possesses a number of disadvantages. In the first place, it is rather elaborate in construction, and it is reported to require considerable attention because of clogging of the numerous capillaries. Further, it moves the samples about in a field of falling drops, and this motion, while it effects equal distribution of the falling drops on all parts of the test specimen, greatly reduces the severity of the test. It was therefore decided to construct a somewhat simpler apparatus utilizing the effect of falling drops, in which successive drops from any one source hit the sample in exactly the same place. The present paper describes the details of the construction and operation of this apparatus, compares its action with that of hard rainfall, and includes a number of typical results obtained by its use.[3]

---

* This article is one of a series of technical papers dealing with the principal phases of the research, development, and production problems of the Army's water repellent clothing. These publications will appear in early issues of various journals in the fields of textiles and garments, and will emanate from the laboratories and organizations participatng in the Quartermaster Corps research and development program.

[a] Research Associate, Milton Harris Associates.

[b] Special Assistant, Research and Development Branch Office of the Quartermaster General.

[c] Director of Research, Milton Harris Associates.

[1] During colder weather, a certain amount of evaporation of perspiration may take place through a water repellent fabric even during rainfall. Thus, if the relative humidity on both sides of the fabric is 100 percent, but the temperature on the inside is higher because of body heat, the absolute vapor pressure of water will be higher inside than out. Under such conditions, water vapor will diffuse out through the fabric.

[2] The investigation was started at the Textile Foundation Research Associateship at the National Bureau of Standards, and is being continued at Milton Harris Associates at the present time. The liaison officer of the Office of the Quartermaster General for this investigation is Dr. J. E. Simpson.

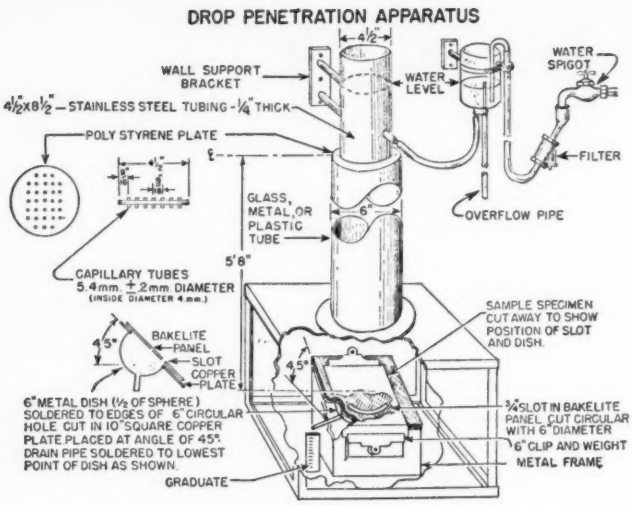

DROP PENETRATION APPARATUS
WALL SUPPORT BRACKET
WATER LEVEL
WATER SPIGOT
4½"x8½" — STAINLESS STEEL TUBING - ¼" THICK
POLY STYRENE PLATE
FILTER
GLASS, METAL, OR PLASTIC TUBE
OVERFLOW PIPE
5'6"
CAPILLARY TUBES 5.4mm ± 2mm DIAMETER (INSIDE DIAMETER 4 mm.)
SAMPLE SPECIMEN CUT AWAY TO SHOW POSITION OF SLOT AND DISH.
BAKELITE PANEL
SLOT
COPPER PLATE
45°
6" METAL DISH (½ OF SPHERE) SOLDERED TO EDGES OF 6" CIRCULAR HOLE CUT IN 10" SQUARE COPPER PLATE PLACED AT ANGLE OF 45°. DRAIN PIPE SOLDERED TO LOWEST POINT OF DISH AS SHOWN.
¾" SLOT IN BAKELITE PANEL CUT CIRCULAR WITH 6" DIAMETER
6" CLIP AND WEIGHT
METAL FRAME
GRADUATE

Figure 1—Schematic Diagram of the Drop-Penetration Apparatus. The apparatus is shown with the hard backing sample support in place.

II. DESCRIPTION OF APPARATUS

A schematic view of the drop-penetration apparatus is given in figure 1. It consists principally of a device for forming the drops, a support for the test specimen, and means for measuring the penetration of water. For fabrics of low resistance to penetration, the sample is tested over a soft gauze backing, and an electrical signalling device is used to indicate the initial penetration of water. For fabrics of higher resistance to penetration, a hard backing of Bakelite is used, and water penetrating through the fabric is collected in a graduated cylinder. The individual parts of the apparatus are discussed in some detail below.

1. The Drop-forming Device

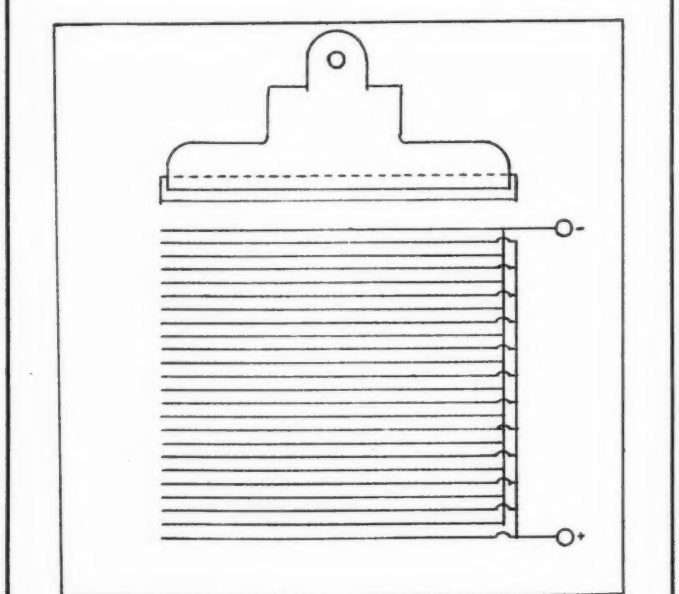
The drop-forming device (figure 1) is essentially a container with a set of capillaries mounted in the bottom. It is desirable to make the container from stainless steel, glass, or some other material that will permit the use of chromic acid solution for cleaning the capillaries. The thirty-one capillaries are all cut from the same piece of Pyrex capillary tubing. They have an outside diameter of 5.4 ± 0.2 mm, an inside diameter of approximately 0.4 mm, and they are approximately 22 mm. long. The lower end of each capillary has been ground smooth and perpendicular to the axis of the tube. (The grinding operation can be easily performed by mounting the capillaries in a drill press.) It has been found convenient to mount the capillaries in holes drilled into a polystyrene plate, ¼" thick, into which they are sealed by means of a polystyrene cement (100 parts of polystyrene, 18 parts of dibutyl phthalate, 90 parts of ethyl acetate, 130 parts of butyl acetate, 90 parts of xylene, and 135 parts of toluene). The plate is then sealed into the bottom of the container. A sidearm tube near the bottom of the container permits the influx of water. A constant head of water is maintained by a means which is described below. The head of water is adjusted to a height such that approximately one drop per second falls from each capillary. The variation in rate of dropping between the fastest and slowest capillaries should not be more than 15 per cent. It will be found convenient to choose a capillary with an average inside diameter between 0.40 and 0.50 mm. It will then be possible to obtain a suitable dropping rate with a reasonable head of water. The inside diameter of the capillaries can be estimated by means of calibrated wires or by filling the capillary with mercury and weighing the mercury.

The drop-forming device is covered with a suitable tray or dish to exclude dust. The entire device is mounted rigidly to a massive pillar of the building, to avoid vibrations. A cylindrical shield extending at least an inch above the lower surface of the capillaries protects the drops from air currents. This precaution is necessary if successive drops from any given capillary are to fall in the same place.

2. Sample Supports

a. Test with soft backing. For fabrics

Figure 2—Sample Support with Wire Grid, for Drop-Penetration Apparatus.



[3] The present apparatus has been found applicable to the study of cotton flat fabrics. However, in studying fabrics of open construction and low density, such as woolens, it has been found that the drop-penetration apparatus may yield results which are inconsistent with those obtained in natural rainfall. The causes for this disagreement will be discussed in a later publication.

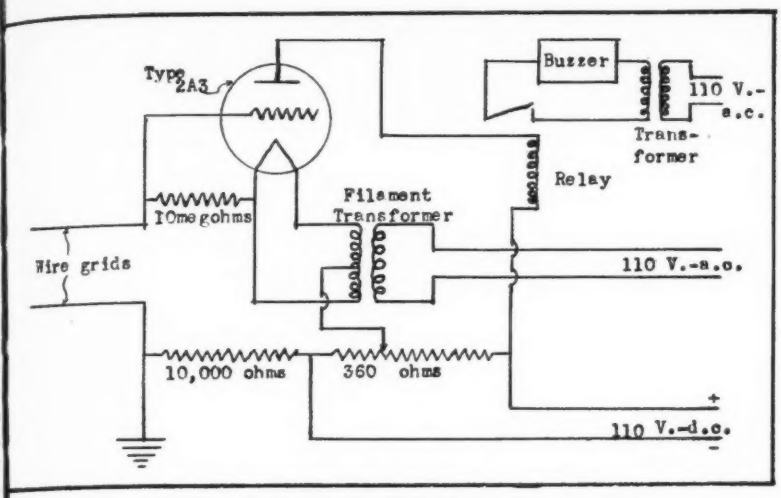


Figure 3—Electrical Circuit for Drop-Penetration Apparatus

of relatively low resistance to penetration the sample support shown in figure 2 is used. It consists principally of a plate of polystyrene, ¼" x 10" x 10". A 6" spring clamp (from a clipboard for holding papers) is attached near the top for holding the sample; a strip of rubber beneath the gripping edge of the clip assures positive support. A centrally located area of the plate, 5½" x 6" in size, is covered with a pair of dovetailing wire grids. When the surface of the plate gets wet, these grids make electrical contact with each other and set off an electrical signal. The grids are made of lengths of tinned No. 20 copper wire, spaced 5 mm. apart. The wires are mounted in the polystyrene plate by running a hot soldering iron along the surface of each wire and pressing gently. If this is properly done, the wires will be approximately half submerged in the polystyrene, and they will be firmly fixed in position. It will be found convenient first to insert the ends of each piece of wire into holes drilled in the plate, then press the wires into the plate, and finally join the wires in the back of the plate to form the grids. The spacing of the wires is obviously not very critical. A suitable electrical circuit for indicating penetration of water is shown in figure 3. This sample support is useful for testing fabrics with drop-penetration times of less than ten minutes when the sample is tested mounted upon a gauze backing.

b. Test with hard backing. For fabrics of relatively high resistance to penetration, the sample support shown in figure 1 is used. It consists of a flat, square bakelite plate 10 inches by 10 inches with a 6-inch clamp mounted along the upper edge. A disk section ¾ inch in width, extending approximately 5½ inches across the Bakelite plate is removed. (This slot is shown in the lower central portion of figure 1).

The holder is placed over a metal plate mounted at 45° to the horizontal. To the under side of a circular hole cut in the metal plate there is soldered a cylindrical or spherical metal container approximately 6 inches in diameter with a ¼ inch diameter spout leading from the bottom of the container to a graduated cylinder placed outside of the test box. The cut out section of the bakelite plate is so placed as to coincide with the lower lip of the container. The sample is held in place by the clamp at the upper edge of the sample holder and is kept under tension by means of a weight of ¾ pound attached to the lower edge of the fabric by means of a 6-inch clamp hanging freely over the lower edge of the bakelite plate. The drops impinge on the sample only on that portion which is above the cut out section, and which is supported by the bakelite plate.

3. Assembly of Apparatus

The assembly of the various parts is also shown in the accompanying schematic drawing. (figure 1). Tap water, at 80° F, is passed through a cloth filter to remove sediment, and then into the constant-level device. The water passes from the constant-level device to the rigidly mounted drop-forming device through a limp rubber tube. The falling drops are protected from air currents by a tubular shield. The shield is mounted on a rectangular box, on the sides of which are runners to accommodate the sample holders. The sample is slid into the path of the drops during a test, and is removed between tests. The distance between the tips of the capillaries and the center of the sample is 5 feet, 8 inches.

4. Method of Measuring Penetration

a. Test with soft backing. Swatches are cut 8 inches in the filling by 9 inches in the warp direction. They are conditioned for 24 hours at 65 per cent relative humidity and 70°F. prior to test. Absorbent backings are prepared as follows: absorbent gauze,[4] thread count 20 x 12, nonsterile, is obtained in a 36 inch width. (This is readily available in 100-yard bolts from hospital supply houses.) The gauze is folded so as to form a pad of 12 layers, 6" x 7" in size. The pad is rolled once in a wringer (the pressure of the wringer rolls is not critical). The absorbency of the gauze may be made uniform by steaming the backings in an autoclave for 5 minutes at a pressure of about 10 lbs. per square inch above atmospheric. The backings are taken from the autoclave while they are hot, and they are ready for use in approximately an hour. The swatch of water-repellent material is clamped in the sample holder with the shorter edge held by the clamp. The gauze backing is placed beneath the sample with the long dimension of the backing parallel to the long dimension of the sample. The end of the sample which hangs over the bottom edge of the polystyrene plate is then clamped with another 6" spring clip attached to a weight of approximately 300 grams. The purpose of the weighted clip is to maintain the sample taut and in good contact with the backing. The weight of the gauze backing should be determined to one-tenth of a gram by weighing on a platform balance before the start of the experiment. For relatively permeable materials, it is sufficient to determine the time required to cause the buzzer to sound, since it has been found that water passes through such materials very rapidly once penetration starts. For materials which permit the passage of water only slowly, the drop-penetration test with hard backing must be used to obtain measurements in a reasonable length of time.

b. Test with hard backing. The size of swatches and method of conditioning are the same as in the test with soft backing. Previous to the start of the test, 5 to 10 ml. of water is used to flush out the cylindrical dish. The specimen is placed on the sample holder and held in place by the clamps described above. The sample holder and cloth are placed on the 45° sample support in the path of the drops, and a timing device started concurrently. The water which passes through the fabric and drains through the cut out section in the bakelite plate is drawn off through the hole drilled in the bottom of the container and measured in the graduated cylinder. The time required for the collecting of 10 ml. of water in this manner may be considered as a relative measure of re-

[4] After numerous preliminary tests, surgical gauze was chosen as a suitable material for a backing on the basis of its availability and uniformity of properties.

sistance of a given specimen to the passage of falling drops, and has been designated as the drop-penetration time. For many purposes, however, it it useful to determine the amount of water that passes through a specimen as a function of time.

III. COMPARISON WITH RAINFALL

It is of fundamental importance to compare the results obtained with an apparatus such as that described above and those obtained in natural rainfall. Such a comparison serves to provide a calibration of the laboratory test, and lend assurance that a good relationship exists between laboratory and actual field tests of performance. For this purpose, a series of poplin samples bearing varying amounts of a solvent-soluble wax finish were prepared in the laboratory. The samples were mounted over gauze backings on plate glass supports, and exposed to rainfall at an angle of 45° during several severe storms. Penetration of water through the sample and into the backing was observed by the following means. A small quantity of basic fuchsine dye was dusted into the dry gauze backing at the start of a test. The dry dye has a grey-green color, and can scarcely be noticed on the dry backing. When penetration occurs, the dye is wetted, which causes a bright red coloration of the gauze which is easily seen through the glass support behind the gauze backing.

The results of a typical series of experiments are shown in figure 4, which compares the drop-penetration times (soft backing) of the series of samples with the number of inches of rainfall withstood before penetration occurred. The results for natural rainfall represent duplicate determinations on samples exposed simultaneously in the same rainfall; those for the laboratory drop-penetration tests represent the means of ten determinations. As shown by the data in figure 4. there is good correlation between the results for the two types of rainfall test. It must of course be recognized that in natural rainfall the distribution of drop sizes varies widely with the intensity of precipitation (3), and that therefore, no one drop forming device can closely simulate all types of rain. The present apparatus provides results that correlate with those obtained in very severe natural rainfall, which provides the most drastic test of water repellent materials.

IV. RESULTS AND DISCUSSION

1. Comparison with Conventional Methods of Testing

It is generally recognized that tests such as spray rating and water absorption determinations measure properties related to surface repellency, and so need bear no direct relation to the resistance to penetration by falling drops of any specific fabric. Thus, a well treated piece of cheesecloth may have a spray rating of 100, and a very low water absorption, and nevertheless show almost no resistance to rainfall. Similarly, air permeability tests, which may in some cases measure the suitability of a fabric for use in a water repellent application (4), do not measure the hydrophobicity of the surface and so also bear no direct relation to resistance to rainfall. It is less generally recognized, however, that a measure of the hydrostatic pressure resistance, which is influenced by both fabric construction and finish, may also give a false indication of resistance to penetration by falling drops. A number of examples which show that poor correlation may be obtained between hydrostatic pressure resistance and resistance to falling drops are given by Slowinske (5). Baxter and Cassie have shown that hydrostatic pressure tests on woolen fabrics often do not correlate well with penetration measurements made on the Bundesmann tester (6). A similar somewhat extreme example, in which several properties of two fabrics are compared, is given in Table 1[5]. The two fabrics compared here are quite similar with respect to air permeability and resistance to hydrostatic pressure, but they differ very markedly in weight and thickness. Thus, the poplin is a relatively thin 5 oz. fabric, and the jungle cloth is a thick 13 oz. material. The poplin contains numerous holes visible to the naked eye and passing through the fabric, as can be seen by holding the sample to the light, whereas the jungle fabric, because of its dense weave and thickness, shows no such holes. As a result, the jungle fabric has a markedly greater resistance to penetration by falling drops, despite the fact that its spray rating is lower than, and its air permeability and resistance to hydrostatic pressure are approximately equivalent to that of the poplin.

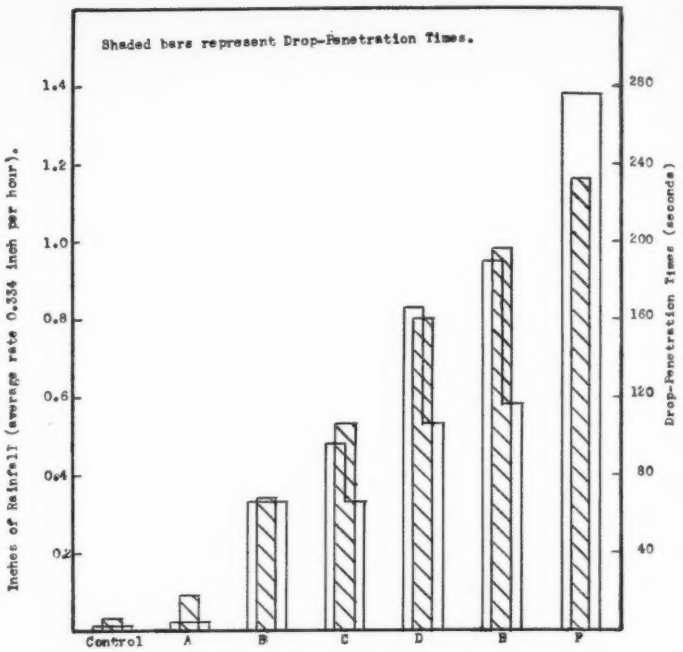


Figure 4—Correlation of Drop-Penetration Test with Behavior of Fabrics in Actual Rainfall.

A further indication of the failure of some of the widely used tests for water repellency to correlate with resistance to rainfall is provided by a consideration of the properties of double layers of fabrics. Doubling a fabric reduces its air permeability by approximately one half, produces only a trivial change in its resistance to hydrostatic pressure, and of course does not alter its spray rating or absorption properties. As shown by Table 2, however, a two layer water repellent fabric shows markedly greater resistance to penetration by falling drops than a single layer. This result is qualitatively consistent with the relative performance of single and double layer garments in the field.

It would be expected that in a comparison of a series of similar fabrics, the hydrostatic pressure tests would show fairly good correlation with the drop-penetration

(Continued on page 307)

[5] The test methods used in obtaining these and subsequent data are described in Federal Specification CCC-T-191a. The air permeability test is the National Bureau of Standards method of Schiefer and Boyland (7).

Proceedings of the
American Association of Textile Chemists and Colorists

JUNE 17, 1946

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CALENDAR OF COMING EVENTS

NEW YORK SECTION:
Outing: June 21
(North Jersey Country Club, Paterson, N. J.)

MID-WEST SECTION:
Outing: June 22
(Lake Lawn, Delavan, Wis.)

SOUTH CENTRAL SECTION:
Meeting (Tentative): September 21
(Patton Hotel, Chattanooga, Tenn.)

NATIONAL CONVENTION:
Silver Jubilee Convention: December 12, 13 and 14.
(Hotel Statler, Boston, Mass.)

MEETING, PHILADELPHIA SECTION

THE May 24th meeting of the Philadelphia Section was held in the North Roof Garden of the Bellevue-Stratford.

Curt Baeringer, Chairman, introduced the speaker of the evening, Dr. Milton Harris, who gave a very thorough talk on "Recent Developments in Washable Woolens." Dr. Harris answered all questions promptly and received a very hearty applause.

There were 139 present for the dinner and 160 present for the meeting.

Respectively submitted,
A. E. Raimo, Secretary

COLOR:
of the Heart and of the Mind*

EDWIN BLANCHARD BROWN
Rhode Island School of Design

PERHAPS the title of this talk should have been, "Color out of the heart is out of the mind," for I do not know of any one subject or study that can be more confusing or that can be more disturbing or about which you can seem to know less and less the more engrossed you become in it. Yet, I do not know of any subject that merits more serious or more conscientious study, in spite of the fact that many great minds have grappled with it for centuries and have succeeded in getting us only as far as we are now in 1946. And how far are we? Well, perhaps just far enough to get our teeth in and bite and chew, but certainly not far enough to digest it beneficially. Perhaps it is a good sign that you practical-minded chemists and colorists of the textile world should call upon me, an artist designer, to talk to you.

As far as those practical, seemingly insolvable color problems are concerned, let's forget them for the moment. Let's take this little wench, color, and embrace her tricky fickle nature to find her in our hearts for what she is worth, for I am more than convinced that color out of the heart is out of the mind.

Gentlemen, I am certain that most of the dilemmas which confront this age are largely due to the persistence with which we attempt to solve all of our problems with a scientific attitude. With factual intelligence, logical scientific hypotheses, scientifically driven compulsions, we attempt to integrate, force, rationalize and regiment the whole pattern of human behavior into paths of scientific endeavor and then we stand back amazed at the results thereof. Since the study of color became a serious subject in the curricula of colleges and universities we have become further and further enmeshed, bound and gagged in our thinking, weakened in our native emotional responses, and almost wholly dependent upon scientific data. I feel sure that we have misled ourselves into an almost unshakable belief that scientific knowledge breeds power akin to divinity, and that brain power, utterly divorced from the stabilizing balance of an equal emotional development, has become the criteria of our civilization. We are prone to forget that very effective and satisfactory use of color has dated back to antiquity, when color was less a matter of the mind and more a matter of the heart. The arts of long dead cultures have never ceased to be a source of inspiration to textile designers and colorists. And surely you, too, must have asked yourselves why this is so; why we, in the twentieth century, surrounded by such greater scientific intelligence, why we find it necessary to stoop to draw inspiration out of the past. Have we in the quest of a color science begun to lose something of great value which would give us an inner source of inspiration in using color creatively? Something which would make it utterly unnecessary to look backwards?

One of the most vital comments on modern education that I have discovered was made by Professor R. L. Kelley in the *Bulletin of the Association of American Colleges* in 1935. Professor Kelley wrote: "The college was brought into the world to face ever recurring, ever renewing tasks . . . Invention and scientific knowledge have taken our hearts and imaginations by surprise; our social and political ideals, our ideas, our morals, our ambitions, our courage have had as yet no corresponding expansion; man has to respond successfully to the challenge, or he will be overwhelmed. He finds himself called upon to adapt himself to his superior achievements. He is called upon to bring one part of himself alongside another part; the side of insight and feeling and will must match the side of inventive genius and scientific knowledge, *but it must match it only that it may go beyond it. . .*" It may be supposed with justification that it takes a major catastrophe to make us realize the importance of such a keen observation.

Even before Kelley's statement appeared in print, back in 1933, we, in the Rhode Island School of Design, were beginning to think along these lines in the training of artist designers. We launched upon many experiments in color training which might be of interest to you, but which I could not begin to go into details about in such a short talk. Chief among these were experiments to free our students of color prejudice. These were undertaken with a full conviction that a functional use of color, for whatever practical purpose it might be applied, depended very largely for satisfaction upon the emotions aroused by it in its proper setting. We were beginning to realize that in the development of our minds, for brain power, we had lost our hearts; that in the very beginning of a color science we were virtually lacking in the sensitivity to evaluate, to enjoy, or even use color as an emotional stimulant. In the conviction that color is ever a matter of the heart, we couched our experiments accordingly; and because color enters into every experience as an integral, inseparable and normal part of life, we attempted to use color in this fashion in our training programs. You might call this a psychological approach to the problem, and it certainly brought into the picture psychological considerations.

I want to tell you about a young lady who put us on the track of one of our most valuable, and more interesting, experiments. This happened more than ten years ago. One day I was watching a student who was struggling with a color-matching problem, with a peculiarly elusive red. The longer she worked the more unsatisfactory trials she made, and the madder she got. Finally, she threw her dripping brush on the floor and got up, tearing her hair and yelling, "Damn that stinking lousy red! Damn all reds! I hate them; I have always hated them; and I will not work with this one another minute. So there!" "So there!" I thought, with considerable alarm, as she stamped out of the room. "We'll have to get to the bottom of this."

The next day we had a long talk in my office—first, about design and the functional relation of color to it, and then about childhood and adolescent sentiments. Feeling that she was prejudiced against a color which had aroused emotions in her of such strength that she was unable to cope with them, I tried to point out the fact that an artist designer uses color much as a musician uses notes or tones, and that, just as a musician who refused to play a certain

* Presented at meeting, Rhode Island Section, April 26, 1946.

note from a score would be considered stupid or foolish, likewise the artist who gave in to a certain prejudice against a color was handicapped. She seemed to admit that this thought was reasonable. Yet, when I gave her a large assortment of colored papers, and asked her to pick out a series of pleasing colors adaptable to textiles, it was decidedly noticeable that she avoided the selection of reds and yellow-reds unless they were very light tints of those hues. So we talked about red; how reds are associated with life, vitality and daring; how they can cause us to breathe deeply with anticipation and excitement; how red looks on the dance floor, on the brilliantly lighted stage, in church windows; and what red may do, seen in juxtaposition with other colors; how red became associated with heroism, danger, war and blood. And with that, gentlemen, she fled the office, with something closely resembling the D.T.'s.

There never has been any question in my mind about the relation between the art student and his teacher. Somehow, that relationship is like that of a doctor to his patient—the slender, delicate thread of creative guidance tugs closely at the sensitive emotional makeup of the creative personality. If you ignore, countermand or dictate to the student with fixed color prejudices, you endanger the roots of the very sensitivity which imparts to art its spark of life. So I felt that I had failed in arousing the cooperative spirit in this girl in an attempt to find out why red was so annoying to her. However, it turned out that there was more to her story. The next week she came to me with an apology for running away and told me that she had talked the matter over with her parents and they had told her a few things about red which she had not remembered: how she had deliberately torn a new red coast on a barbed wire fence when she was ten, because she had not wanted to wear it; how she had refused to wear other clothes of a certain red hue, also; how she refused to visit an aunt who had a reddish color scheme in her reception hall; how the family car had been repainted at her insistance. And yet, as she talked, I noticed that she wore a lavishly brilliant red lipstick! So we started all over again to search out the trouble, but now the girl was certain that I wanted to help her, and now I was sure that the prejudice had its origin in early childhood. We worked diligently and patiently together to track down this particularly offensive red, starting with related hues of the red which had caused the emotional outburst in the classroom, and then examining value and chroma changes of these. Meantime, I had discovered in one of Matthew Luckiesh's textbooks, *The Language of Color*, a passage that dealt with the affective values of color in arousing emotional states of being through color associations. So we started with this as a point of departure. My pupil wrote down her thoughts as they were associated with each of the color samples in question, and she wrote these down just in the order in which they presented themselves to her. This, you see, is a sort of free association experiment. In addition, she tried to describe the way she felt as a result of viewing these reds. This was done by choosing words from a list of descriptive adjectives only. Finally, we narrowed her emotional disturbance down to a few dark reds with a yellowish cast, colors similar to burnt sienna pigment. The associations always seemed to be the words "blood," "bloody," "flesh," and I was at a loss to evaluate the data. Surely, this is not the color of blood, I thought. What a strange fixation! Then I came upon a sample in which there was a follow-up of the words, "policeman," "hospital," "sickness." "When you were little, were you ever hurt so badly that you bled and had to go to a hospital?" I asked. "I don't think so," she replied, "but I will ask my mother." The following day the girl came to me full of excitement and happiness. "The mystery is solved," she said. "When I was seven my little playmate was struck by an auto as we ran across the street; there was lots of blood on the newly cemented street in front of my house. I was very sick from the shock of it and I guess that's why I have always hated that kind of a red." And of course it was. Once the hidden association was revealed as a survival of childhood, which was causing an emotional prejudice of unwarrantable dimensions, the color lost its power to annoy this girl. Later she told me she went right to a dress shop and was complimented by her friends on the pretty new red wool dress and how well she looked in that color. Incidentally, her best design that year used this color lavishly and I feel certain that she now will always enjoy the color appreciatively because of the trial she went through over it.

Yes, color is always a matter of the heart. We like her, or we dislike her, because of the experiences we associate with her. And the power that she holds over our emotions is as great as any I know of.

In the years that have followed this early teaching experience I have seen this kind of thing happen again and again, and after the students have taken a free association test with color samples and realize that much of our response is tinctured by the memory of our childhood experiences, they begin to use colors with more daring, free of inhibiting factors. Other things considered equal, certain hues, tints and shades seem to bring about rather direct emotional states of being. And unless a person has some fixation of a contrary sort we can appear to rely upon a general pattern of emotional reactions to color. Reds, yellow-reds, yellows and yellow-greens tend to arouse feelings of energy, excitement and vitality. Wherever there is a maximum strength, and no design contrary to this idea, we may term these as energizing colors. Greens, blues, blue-violets which are intense but not dark—and all light tints of all hues—tend to arouse feelings of restfulness, quietness, peacefulness. They are associated with light and airy, springlike ideas of tranquility. We may term these as tranquilizing colors. Then all naturally dark colors, including red and blue, but particularly purples and red-purples — and in fact any darkened color as yellow to khaki or yellow-red to browns, etc.—tend to become associated with ideas of a serious, contemplative, oppressive and even mysterious nature. These are colors of a heavy, weighty character. We may term these as subduing colors. We have done considerabl experimenting with this concept of mood inducing colors — all initiated by Mr Luckiesh's findings. With our Freshmen we have applied it to the creative interpretation of music, producing design inspired by music—and I am experimenting with it in fabrics for advanced students.

While I do not believe in thwarting the native original interpretation of design motifs in color, I do believe that a general reaction pattern tends to exist—and for practical reasons it seems wise not to ignore it.

In our own experiments the consensus of students' opinions seemed to verify Mr. Luckeish's findings. And in almost every case, excepting where a rather strong color prejudice existed, our students followed this general reaction pattern. There is a greater significance to color prejudice than we are in the habit of attributing to it.

I had a rather tangible proof of this last fall when one of my best textile designs was rejected by a stylist as a *ba* design because she was actually nauseated by a certain yellow-green. Furthermore this stylist was infuriated with me when I suggested that perhaps the design would be more acceptable in different colors. I should have liked to talk with her about hidden childhood experiences, but I felt sure, under the circumstances, that the effort would have been misunderstood. Yet, when the spring color trend swing

once again to yellow-greens this stylist will suffer the tortures of the damned, and because of her dislike for this color, her firm will miss sales that it might have had if she were freed from this prejudice.

I have no doubt that color prejudice, abetted by hidden childhood experiences which have become inseparably linked to certain specific colors, has more to do with the business of working with color than any other one factor.

I feel sure that it can influence the color matcher, because under emotional strain he cannot perform his duties efficiently—thus resulting in a near matching rather than an exact one; but of course science can come to his aid here, and the spectrophotometer can check his inaccuracies.

I believe that research on wholesale sales and retail sales would reveal a dozen different ways that they have been influenced by color prejudice; and I am sure that I have no solution to offer, other than the fact that color needs to be studied as a matter of the heart very early in school life.

Sometime, while I was still a boy, I was initiated into the wondrous realm of color when I was privileged to see the color spectrum made from light refracted through a prism. I have never forgotten the thrill of the pure and brilliant colors that I saw then. So it was with disgust and considerable discouragement that this mystery of color was explained to me in terms of the three primary colors, and especially when I found they consisted of three greasy wax crayons and we were told that all color could be made from them. I wonder if you did not experience a similar reaction in your early school programs. I also wonder if you, as a student, ever questioned the veracity of the three primary color theory when you found that it just wouldn't work in practice. I don't have to wonder about my seven-year-old child, for her reaction was, "Daddy, it's the bunk!" Yet, most children's introduction into the field of color knowledge has just such a basis; and is it any wonder that color experience of this sort paves the way for misunderstandings and lays the foundation for dissatisfaction?

Of course the three primary color theory has been outmoded for generations. In the time of Newton and until the advent of synthetic pigments and coal tar dye colors it was a useful theory, because the existing color media lacked the vibrant intensities and multivaried hues of our color world today. It was taken for granted that color mixture with pigment or dye could not approach the spectacular beauty of nature. But today, surrounded by intensities and hue varieties produced by the chemist and dye specialist, we can no longer tolerate the three spectral primaries as a basis for making color.

When the synthetic printing ink products were placed on the market the printers revised their primaries. After these synthetic colors were produced so that color mixture could be made without deteriorating chemical reactions to change the hue of the mixture, the revised primaries became entrenched for reproduction on paper.

With the development of the Ives trichromatic palette, which consisted of revised primaries, we had the beginnings of color mixture of great brilliance, producing balanced hue intermixture that could have eradicated much of the drudgery for the artist designer. But, somehow, the Ives trichromatic palette never became popular, and of course this was largely due to background training, associations, and the laborious technical training with the standard pigments. It was to a large extent also owing to the fact that the spectral primaries, because we had been *taught* that they were right, seemed right.

A comparable situation exists among the textile dyers, with their endless number of dyes and all of the dye formulae dating back nearly to the Middle Ages. It is quite natural to believe with unshakable faith both the things we have been taught are true, and the things we have demonstrated successfully in practice. Any dyer, confronted with this kind of thinking, tosses it off as sheer nonsense, the product of abyssmal ignorance. Nevertheless, orderly thinking can be substituted for the blind followni g of formulae. And color mixture can be simplified through it.

In the very early 1900's Albert Munsell, an artist, realized the falsity of the three primary colors, and in their place established what he called, "five principal colors." These he experimented with and established as standard hues, basing his selection of course upon available permanent pigments. The Munsell system fought for every inch of ground it gained and, as you know, eventually won acceptance by the Bureau of Standards. There is no doubt in my mind but that Munsell made the very greatest contribution to color study that the world has ever seen, for in 1900 he apprehended the possibility of a developing color science which would make possible new hues and greater intensities than he could dream of in his own time. Of course he did not have Hardy's spectophotometric system, for measuring the wave length indices of colored light. That was to be a later development, for mechanical reception of color sensations was to follow upon an ability to train the human visual—mental conception of color. Therefore, Munsell established a 100-hue circuit which was accommodated to the normal human eye—100 hue sensations which could be distinguished by the eye and memorized by the mind. Later, psychologists, experimenting on Munsell's basis, found that even more than 100 hues may be disinguished and memorized.

In our Freshman studios at the School of Design we had a color-mixing experiment which enabled the students to produce pigment swatches numbering as many as 300 to 400 slightly different hues, comprising a pigment spectrum. But we discovered that very few students possessed the optical acuity to distinguish just noticeably different hues beyond 100 in number from their greater number of samples. In a few instances individual students claimed to see varying numbers beyond 100, and up to 240. These students beyond a doubt should become color specialists, for their visual sensitivity is possessed of the keen acuity indispensable in this field. Of course a painted sample of color or a dyed fabric possesses other qualities than the hue element. It is never seen divorced from the amount of light it reflects and the degree of grayness it possesses. It is in chromatic color values where most color systems break down. The rods in the retina of the eye, which are sensitive to light, are sensitive to more than the nine steps emphasized in color systems. We had students who could distinguish just noticeably different neutral values exceeding fifty or sixty, before experimentation began; but it is true that few people can identify a neutral gray sample with finer than 10 per cent discrimination without the use of a reference chart. Munsell reclassified the neutral value scale in 10 per cent steps, as you probably well know, progressing from an absence of light—or theoretical black—to a totality of light, which may be seen as the highlight on a white porcelain object.

Varying the amounts of pigments or dyes with water, or when pigment is altered with opaque white paint, the color is automatically weakened; but this weakening effect upon the hue does not occur in even sequence, as the logic of the mind might indicate it should. Munsell made this significant discovery and incorporated it into his system, and no system before or after has taken this principle into account. Hues of pigments and dyes vary remarkably in their native maximum strength, and the way this factor was taken into account

by chromatic degrees in Munsell's system accounts for the possibility of including that new chemically produced red or blue or violet which did not exist last year. No other color system that I know of allows this.

Working with the Munsell system trains the eye to see a hue in terms of an imagined neutral value with the same per cent of light reflection; and by arduous, determined study an individual can learn to memorize degrees of chroma progressing from utter weakness to maximum strength. Therefore, the time involved in studying the Munsell system is never lost, nor is the training of the mind invalidated with each new development in the color field.

I have heard much said against the Munsell system, in terms of the necessity to carry around the Munsell handbook to check notations one might make of a color sample; and I suppose this is necessary, as one might check one's spelling by referring to a dictionary in the writing of a word. But in writing we do not check every word, we rely upon our good mind and its ability to memorize; and so it is in the checking of a color notation: the well-trained mind can learn to dispense with the color dictionary except in the notation of colors as strange as the obsolete words of language. For classification and identification, color becomes a matter of the mind and the dull mind cannot master it without constant reference to the standard dictionary of color. And then, as I have intimated before, many things influence the seeing of color, for the heart and the mind are tied inseparably together. The emotionally disturbed person cannot identify color accurately, and if the emotional disturbance rivets upon a particular color, he compensates for the wear and tear on his emotions by partially immunizing himself to it. This is true in all other emotional experience, also.

When all is said and done about color, we cannot wander too far away from the mechanism of the human eye and its peculiarities and idiosyncracies, for we must realize that only the scientist examines color in a detached way and we must realize that only the scientist examines color in a detached way and it is only he who studies color by means of scientific equipment. Most people who wear it, buy it, use it, embrace it as a part of living, can only attend to it as light stimulation in terms of radiant energy which is transformed by the human eye into nervous energy which activates the system. Thus, light sensations taken into the eye, stimulating the photo-chemical substance in the cone like nerve endings of the retina, act like a switch turning on the juice which runs the machinery for human reactions. These photo-chemical receptors may be likened to the blood corpuscles, for they rush to the aid of their attacked members. Thus, when looking at red, activating the red cones in the eye, we find that we are beginning to see a fringe of blue-green also. When the red is taken away, we begin to see a blue-green that never was present at all. Scientists call this an after-image phenomenon and more or less of it is going on all the while our eye is attuned to color sensations. Artists and designers, becoming aware of this, try to use it effectively in harmonious color combinations; and Munsell, in setting up his system, felt that it was important enough to base his complementary colors upon after-image sensations. We have our students make what we call a physical color wheel, which is based on an after-image color sensation, so that they will be aware of the true compensating color reactions. I have found the person with a color prejudice will usually have a color preference which corresponds to the after-image sensation of the color which annoys him. A logical basis for color proportion may be found in the after-image experience because the blue-green area produced as an after-image sensation for a red area always seems to be proportionately larger, in accordance with the strength of the color sample.

I used the phase, "complementary," but Munsell had the right idea when he termed blue-green to be the opposite of red, for the word "complementary" is a misnomer. After-image colors do not complement one another; they antagonize one another, for when they are both placed in the same design, without the influence of other colors to sway the overall color sensation, the red and the blue-green fight for equal attention. This of course in a design tends to negativize color effect. Yet, in grade school, without knowing the reason why, red and green are taught to us as color pairs of unsurpassed beauty, called complements, and entrenched in students' minds as a means of achieving successful color harmony.

I shall never forget a youthful experience of my own, whereby I transformed, with the aid of so-called complementary paint, a rather charming room into a hideous torture chamber where blue and orange fought a continuous fight relentlessly. Since the after-image phenomenon is universal in normal vision, we cannot unduly emphasize its importance both for and against beauty in a product or a work of art and efficiency in the job of creating it. Yet I have been privileged to see many failures in the match of an artist's design for printed fabrics which very easily could have been owing to the manner in which the match was made and the disregard of after-image phenomena. Its applications are too diverse to give in detail in such a talk as this.

One very interesting illustration was printed in *Coronet*, April 1945, in an article by George D. Gaw. He wrote: "A Chicago wholesale meat market, located in the famous stockyards, one time found its business melting away like ice in summer. It was an old, established house which always had sold the choicest meat products, and its display room was its pride. The management had changed the decorations, anticipating an increase of business as a result. Discouraged and alarmed when it slumped instead, the owner finally summoned experts to tell him what was wrong. 'Your color scheme is the trouble,' one investigator told him. 'You have bright yellow walls and ceiling. Yellow produces a blue after-image.' The color expert showed the owner how people had their sight 'poisoned' by the varying shades of yellow. Because of the blue after-image the rich, red meat took on a bluish hue and made the customers think it was stale and even spoiled. He advocated a color that would enhance the red. A bluish-green color was introduced. The meats became more inviting than ever—with the red meat redder and the white of the bones whiter."

But I suppose today no such problems exist, for in our present emotional state over meat it isn't the color that matters, but the taste and how much. And so it has been with fabrics during the scarcity, but when once again things strike a norm, color will once again be the businessman's means for attracting trade and holding it. Once again color, as a matter of heart and mind, will take on its rightful importance. The dead wood of complacency and isolationism has been partially eliminated through the chaotic struggle the world has just witnessed. We might rightfully expect that we have it within us to go forward in harmony and unity. In textiles we may expect great things if educators can foster the way through a balanced program; and where color is concerned, the artist's matter of the heart must also become the matter of the mind, and the manufacturer's matter of the mind must also become a matter of the heart. The heart and mind of the public, through balanced color education, may well demonstrate the value of the union.

CELLULOSE ETHERS

and their Application to Cellulose Fibers*

RALPH T. K. CORNWELL, DAVID T. MILNE and DONALD S. PORTER

Research Laboratory, Sylvania Industrial Corporation, Fredericksburg, Virginia

IN order to understand and control the effect of cellulose ethers when used as textile finishes, it is necessary to know something about the ethers themselves. The more scientific knowledge we have, the easier it is to manufacture ethers which will give desired textile finishes. Since this relationship between the "ether molecules" and the "hand" may not be too generally understood, it has been selected as the subject for this brief presentation. It would require too much time to develop the subject historically and to give credit to each of the many scientists who have investigated this field in the last thirty years. Hence, an effort will be made to consider only the present status of the situation.

The remarks will be confined entirely to the series of hydroxyethyl-cellulose ethers known as "Ceglin" and which are soluble in aqueous solutions of caustic soda and insoluble in water.

The starting material for the manufacture of these ethers is cellulose, either wood pulp or cotton linters. The cellulost is converted into alkali cellulose in the usual manner by steeping in an aqueous solution of sodium hydroxide and pressing out the excess caustic solution. The alkali cellulose is then reacted with either ethylene oxide or ethylene glycol monochlorohydrin to form hydroxyethyl cellulose. After neutralizing the caustic, the excess chemicals and by-products are washed out and the ether dried.

A series of these ethers, each with similar and also different properties, can be made by controlling two factors:—

1. The degree of substitution or the number of ether groups per glucose unit in the cellulose molecule.

2. The degree of polymerization or molecular size of the ether.

These two factors determine not only the solubility of the ethers in aqueous caustic soda solutions, but also other properties of the ethers which govern the particular type of finish or "hand" obtained when these ethers are applied to cellulose fibers as textile finishes.

The first factor, degree of substitution, is controlled by the amount of etherifying agent used and manufacturing conditions.

In the case of these particular cellulose ethers, known methods of chemical analysis for the degree of substitution seem to be questionable. Hence, University Fellowships are maintained for the thorough investigation of the structure of these compounds.

The second factor, molecular size, depends on the cellulose used as a starting material and the amount of degradation of this cellulose or the ether permitted by allowing one or both of them to age in the presence of the caustic soda in the alkali cellulose or reaction mixture.

The amount of degradation can be followed by determining the viscosity of definite solutions under controlled conditions. The figures obtained represent an average of all the molecular sizes in the solution, but these are satisfactory for practical purposes. For convenience, these figures are called "Standard Viscosities."

The accompanying data (Table I) on Film Properties versus "Standard Viscosity" will illustrate the effect of the average molecular size on the film forming properties of the alkali soluble cellulose ether. As far as I have been able to find out, data of this nature for this particular series have not been disclosed before. It is interesting to note that it parallels the work reported by investigators studying the effect of molecular size on the film forming properties of certain synthetic resins or cellulose derivatives soluble in organic solvents.

Starting with alkali cellulose made from a good wood pulp, an ether was made using ethylene oxide. The steeping and reaction were carried out quickly and part of the ether purified at once. The rest of the alkaline reaction mixture was allowed to age at 23° C. From time to time successive portions of the ether were isolated. The viscosity of an aqueous solution containing 6 per cent ether and 9 per cent sodium hydroxide at 25° C. with reference to glycerol as 1, was determined and this "Standard Viscosity" used to identify the particular Ceglin.

The degradation of the hydroxyethylcellulose by aging was measured by the "Standard Viscosity." Referring to the accompanying table, the values for this series are given in the second column. The sample withdrawn immediately after etherification had a "standard viscosity" of 97.0. The values for subsequent samples were progressively lower.

The more degraded ethers were more soluble in dilute caustic soda solution.

Films of the different ethers were cast on glass plates using solutions having approximately the same viscosity. The concentration of Ceglin used and the corresponding viscosity of each solution are tabulated in the columns headed "Casting Solution." The more degraded was the Ceglin, the higher was the concentration required to obtain a solution of the desired viscosity for casting the films.

The ether was coagulated with a 10 per cent Ammonium Sulfate bath. The films were washed and dried on frames. The thickness and density of all the films were essentially the same. These data are given in the two columns at the center of the table. The strength, stretch, and folding endurance of the films were determined.

The Schopper test was run on re-wet samples made by soaking the test pieces in water. The results are shown in the columns headed "Schopper."

The Folding Endurance tests were made on dry and conditioned films and the data are given in the last two columns of the table.

When the ether is further degraded it no longer forms a self-supporting film. Such an ether, No. 7, was used in making the "Blend" described in the bottom line of the table.

The problem then becomes the correlation of these data on cellulosic films to the type of finish or "hand" which may be expected if and when one of this series is applied to a textile.

The cloth is passed thru a solution of one of the Ceglins and the excess removed by squeeze rolls. The ether is then made insoluble or coagulated by neutralizing the caustic soda with a suitable acid. It is also possible to coagulate the ether by treating with mercerizing caustic. The fiber will be coated or impregnated with a solution of the ether when it passes into the coagulating bath. There is a tendency for the treated textile to retain the shape with which it enters this bath so that compressing may be of inerest at this point. In fact interesting designs can be

* Presented at meeting, New York Section, May 3, 1946.

TABLE I
Films of Hydroxyethycellulose
"CEGLIN"

Sample Number	Viscosity Ceglin [1] (Standard)	CASTING SOLUTION		FILMS				
		% Ceglin (9% NaOH)	Viscosity	Thickness 1/10000"	Density 65% R. H. 70° F.	SCHOPPER [2]		FOLDING (Av.) [3]
						Strength	Stretch	Lengthwise	Crosswise
1	97.0	3.1	5.0	11	1.50	1310	134	...	...
2	4.8	6.0	4.8	11	1.48	770	87	1554	1304
3	1.0	8.2	4.6	9	1.49	590	68	1202	1118
4	0.38	10.0	3.2	10	1.48	376	39	441	459
5	0.20	11.1	3.3	12	1.52	273	17	322	351
6	0.13	11.5	2.8	11	1.43	135	12	...	...
Blend [4]	9.70	5.0	3.2	11	1.45	533	87	491	345

[1]. Viscosity of an aqueous solution containing 6% Hydroxyethylcellulose and 9% Sodium Hydroxide at 25° C. with reference to Glycerol as 1.

[2]. Schopper test on samples which have been soaked in water (lbs/sq. in. & % stretch).

[3]. Folding Endurance, M. I. T. Tester, 1.5 Kg. tension (Tests made at Electrical Testing Laboratories, Inc., New York City).

[4]. 50% No. 1 and 50% No. 7, Standard Viscosity 0.05.

obtained by embossing. All chemicals must be thoroughly washed out before the cloth is dried. The lower molecular weight ethers tend to exhibit a little more plasticity than the higher and calendering with both heat and pressure during the drying operation will give an unusually smooth finish. The method of application is exceedingly important and will affect greatly the finished product, especially its resistance to laundering. Generally, for instance, the cloth is opened up and the porosity increased. This is at least partially caused by laying the nap. Also, the opposite of this, or complete windowpaning can be accomplished.

Keeping the method of application uniform the finish or "hand" varies directly with the film forming properties of the ether.

Stiff, crisp, linen-like, lintless fabrics would be obtained by treating with a 1 to 3 per cent solution of the largest molecular size ether, i.e., highest standard viscosity Ceglin. The greater the film forming properties the crisper the finish.

A soft, full "hand" would result by treating the same cloth with a low molecular weight, weak or non-film forming Ceglin, using a 6 to 10 per cent solution. All gradations in between are possible.

The finish is durable and resistant to laundering. Abrasion resistance can be increased, hence increased wear. As there is a tendency to hold the shape of the cloth, shrinkage control is facilitated.

As the Ceglins are insoluble in the solutions encountered in laundering and even in kier boiling, they are not removed or "washed out" in these or in similar operations. However, in order to obtain a "hand" or dimensions which are resistant to laundering, it is necessary that the Ceglin be applied properly and that subsequent operations be conducted in a suitable manner. Every type of fabric presents its own peculiarities and requires individual investigation.

These ethers are pigment binders so that coloring with pigments can be accomplished simultaneously with Ceglin tretament. The solutions of the ethers may be used as dyeing assistants. For example, improved dyeing with vat colors can be accomplished by padding the cloth with a dispersion of the vat color pigment in a Ceglin solution. After coagulation, the vat pigment can be reduced *in situ* to the soluble state and then oxided back to the vat color. This method results in improved coverage.

Different samples of a 64x56, 5.50 Print cloth (desized and bleached) were treated (1) with a 3 per cent solution of a Ceglin with high standard viscosity and (2) with a 3 per cent solution of a Ceglin with a low standard viscosity. Comparison of these treated samples with a sample of the untreated cloth illustrates the effect of the molecular size of the ether on the "hand" or finish.

No effort has been made to give details necessary for treating certain constructions to make, for example, a damask or chintz. Rather, I wanted to show you how we are attacking the problem of these cellulose ethers as textile finishes and to emphasize the fact that by working with you, we can tailor-make an ether to meet your requirements.

The importance of the fact that in using these materials as textile finishes one applies a cellulosic material to a cellulose fiber is so self-evident to members of this association that I almost refrained from mentioning it.

VISIT HEADQUARTERS AT LOWELL

MEMBERS of the executive committee on research and several of the chairmen of sub-committees visited the headquarters of the A.A.T.C.C. at the Lowell Textile Institute, Lowell, Massachusetts, on April 11th, to inspect the facilities available and observe the work which is going on there now.

The group included the following: Charles W. Dorn, chairman of the washfastness committee; Herbert G. Scull, chairman of the gas fading committee; Arthur J. Kellner, chairman of the committee on resistance to insect pests; Frederic A. Prisley, chairman of the detergency committee; Prof. Percival Theel, chairman of the committee on methods of analysis; Daniel P. Knowland, chairman of the color transference committee; Kenneth H. Barnard, chairman of the committee on ageing of textiles; William H. Cady, past-president and chairman of the committee on deterioration of textile fibers exposed to light; P. J. Wood, past-president and member of the executive committee on research; Dr. William E. Coughlin, chairman of the steering committee on dimensional changes in textile fabrics; J. R. Bonnar, secretary of the executive committee on research; L. S. Little, chairman of the executive committee on research; C. L. Nutting, chairman of the wool group of the detergency committee; Dr. Herman E. Hager, chairman of the committee on flammability of consumer textiles; John N. Dalton, chairman of the committee on fundamental properties of fibers.

Acting as hosts to the group were the following: Dr. Louis A. Olney, president-emeritus and chairman of the research

committee; Dr. Harold C. Chapin, secretary; Dr. Harold W. Stiegler, director of research; Kenneth Fox, president of Lowell Textile Institute; Prof. Elmer E. Fickett, head of the chemistry department at L.T.I.; and Prof. John H. Skinkle, assistant professor at L.T.I.

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MEMBERSHIP APPLICATIONS

ASSOCIATE

Harry A. Barth—Asst. to Director of Merchandising, W. T. Grant, Co., New York, N. Y.

James R. Clarke, Jr.—Industrial Oil Sales Eng'r, Colonial Beacon Oil Co., Boston, Mass.

Joseph E. Connell—Tech. Salesman, National Oil Products Co., Boston, Mass.

Ida M. Didier—Asst. Prof. of Home Economics, Ill. Inst. of Tech., Chicago, Ill.

Walter H. Moon—Supt., Charles J. Haas, Inc., Philadelphia, Pa.

Joseph J. Murray, Jr.—Analytical and Consulting Chemist and Bacteriologist, Greenville, S. C.

Robert Poron—Executive of Etablissements Vitoux, Troyes, Aube, France.

Raymond Szymanowitz—Tech. Director, Acheson Colloids Corporation, Newark, N. J.

J. A. C. A. Thijs—Dyehouse Supervisor, H. J. Thijs De Beer, Textielveredeling, Tilburg, Holland.

Boris Warkow—President, Roycraft Fabrics, Inc., New York, N. Y.

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MEETING, MID-WEST SECTION

THE Spring Meeting of the Midwest Section was held at the Schroeder Hotel, Milwaukee, Wisconsin, May 4th, 1946.

The afternoon meeting was called to order at 2:20 P.M. and 82 members and guests were present.

A. Feit introduced the guest speaker, R. T. Mills of E. I. du Pont de Nemours & Co., Peroxygen Products Division, who delivered a paper entitled "Peroxide Bleaching." He was assisted by Thomas Bell, also of the du Pont Co.

Mr. Mill's lecture was well received and many interesting and enlightening questions were asked and answered.

INFORMATION FORUM

The panel of experts was composed of: Gil Latham, Al. Olson, Joseph Jones, William Fisher.

Question No. 1.

Do you have static when folding cotton bleach cloth? How to prevent?

Answered by T. Bell.

Yes static does occur, and to overcome, use a water spray to cool cloth or dry slowly.

Question No. 2.

Has peroxide bleached cotton cloth higher tensile strength than chlorine bleached cotton cloth?

Answered by Mr. Mills.

No difference if properly controlled. Joe Jones and Al. Olson concurred in this.

Question No. 3.

In the use of Dearborn Formula No. 47631 for boiler treatment, what is the effect if any in the case of a leak in the closed coil steam pipe returning steam to the boiler when bleaching? Also what happens in a bleach bath when using steam direct from boiler?

Answered by Bill Fisher.

He concluded such a condition is extremely bad for the boiler and should be corrected.

Question No. 4.

What line of dyestuffs and what general procedure do you consider most desirable for producing the usual dark shades of men's hosiery made of nylon and mercerized cotton?

Answered by Al. Olson.

Use aftertreated colors for the mercerized cotton and neutral acid or milling colors for the nylon. Good wash and light fastness so obtained.

Question No. 5.

What is the proper procedure to follow in regards to intermediate treatments in naphthol dyeing after the goods have been naphtholated?

Answered by Joe Jones.

Use of two salt rinses is satisfactory. R. B. Child stated that for piece goods the use of sodium perborate plus a salt rinse, cold rinse and then couple is okay. Use of acetic acid in cold water will prevent crocking. Mr. Kaler brought out the fact that salt is okay on substantive types but not for others.

Floor Question

How can acetate dyes be stripped from nylon?

Gil Latham advised using Sulfoxite for good results. Arthur Hultberg suggested hydrosulfite first, followed by Sulfoxite. Bill Fisher also recommended hydrosulfite and acid.

* * *

The afternoon meeting was adjourned at 3:40 P.M.

Dinner was served at 7:50 P.M. attended by 100 members and guests.

After dinner a technicolor sound movie was shown entitled "Portrait of an Industry" released by Calco Chemical Division of American Cyanamid Company depicting the growth of the industry.

On a motion by Al. Olson, seconded by Ed. Siegrist the minutes of the previous meeting were accepted as read.

On a motion by S. Klein seconded by Clarence Wille the Treasurer's reports were accepted as read.

Al Feit read a report by P. J. Kennedy on the importance of the Intersectional Contest as outlined by his committee. Ed. Siegrist volunteered to accept chairmanship of the Intersectional Contest Committee.

The Annual Outing of the Midwest Section will be held at Lake Lawn, Delavan, Wisconsin, June 22nd, 1946. Committee for the outing: Eric Camp, chairman, assisted by George Osha, Gordon Stott, L. B. MacFarland and A. Alexander.

NEW BUSINESS

Al Olson suggested the panel of experts should be given more time to study submitted questions so that more complete answers may be given.

Louis Hoehn recommended that all questions be submitted not later than 30 days prior to the meeting. Much discussion followed and it was decided to put questions in the meeting notices which are sent out 30 days in advance of meeting.

On a motion by S. Klein seconded by Harold Doyle the meeting was adjourned at 10:10 P.M.

Respectfully submitted

George Chabot, Jr.
Secretary

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UNEMPLOYMENT REGISTER

This column is open for four insertions per year, per member, without charge. Blanks can be obtained from, and filed with, the Secretary of the Association, Lowell Textile Institute, Lowell, Mass. It is understood that these will be open to inspection by prospective employers, who can obtain further information through the code numbers from the Secretary.

46-5

Education: Lowell Textile School, Night, Chemistry, 1942.
Experience: Hosiery dyeing and finishing.
Age 29; married; references.

46-6

Education: Graduate, Lowell Textile Institute, B.T.C., 1942.
Experience: Recently Lieut., U.S.N.R., and Commanding Officer.
Age 27; single.

46-7

Education: Graduate, Bradford Durfee Textile School, 1933.
Experience: Five years as Textile Engineer, developing Non-woven fabrics.
Age 31; married; 3 dependents; references.

46-8

Education: Graduate, Lowell Textile Institute, B.T.C., 1938.
Experience: Industrial research on resin finishes for cotton: Research, as 1st Lieut., C.W.S., on flame proofing cotton.
Age 31; married; references.

Drop-Penetration Apparatus

(Continued from Page 298)

test. The results shown in Table 3 for a series of comparable poplins support this expectation, but they indicate that the drop-penetration test is more sensitive. Thus, the samples containing 1.2, 2.5 and 3.5 per cent, respectively, of a non-durable finish differed only slightly in their air permeabilities, spray ratings and absorption and hydrostatic pressure values, whereas they showed rather substantial differences in their drop-penetration times.

2. Comparison with Bundesmann Tester and du Pont Rain Tester

It is of considerable interest to compare the results obtained on the same fabrics with different devices also designed to test resistance to penetration. Such a comparison between the Bundesmann tester and the drop-penetration apparatus is given in table 4.[6] The results obtained on the Bundesmann tester are given in terms of the number of grams of water penetrated after 10 minutes of exposure, while those for the drop-penetration apparatus represent the time required for 10 grams of water to pass through the fabric. It is apparent from the data that a reasonably good relationship exists between the results for the two types of measurement. The results indicate that a sample with a drop-penetration time above about 15 minutes gives no penetration in the Bundesmann tester during the standard 10-minute period of test. Thus, the drop-penetration device, which is considerably simpler to construct and maintain, appears to give essentially the same type of information as is furnished by the Bundesmann apparatus.

A similar comparison between the drop-penetration test and the du Pont rain test is given in table 5. While there is a fair general correlation between the two sets of results, there are several samples for which the correlation is not very good (numbers 4 and 11, in particular). This result might perhaps have been expected, in view of the rather different manners in which the two devices subject the samples to moving water. It is interesting to note that of the thirteen samples tested in the du Pont machine, six show very little penetration (0 to 1.5 g.), four permitted the blotters to become almost completely saturated (48 to 58 g) at all the heads tested, and only three showed intermediate degrees of penetration. This result suggests that if a sample permits any penetration, the force of the streams of water is generally sufficient to produce complete penetration in a short time.

3. Examples of Performance of Drop-Penetration Apparatus

Some typical examples of the performance of the drop-penetration apparatus

[6] We are indebted to Dr. P. LaRose of the National Research Council, Ottawa, Canada, for the results obtained on the Bundesmann apparatus.

TABLE 1
Water Repellency Tests of Cloths of Different Construction and Finish

Cloth	Repellent	Air Permeability $ft^3/(min \times ft^2)$	Spray Rating	Absorption Static Immersion Test %	Hydrostatic Pressure Value cm	Soft backing Drop-Penetration Time sec
5 oz. poplin	Solvent type non-durable	5.6	90-100	18.5	28.3	119
13 oz. jungle cloth	Wax-emulsion	5.4	80	14.8	27.1	>5000

TABLE 2
Drop-Penetration Times for Single and Double Layers of Various Poplin Samples

Sample No.	Penetration time, single layer sec	Peneration time, double layer sec
1 (non-repellent)	6	8
2	15	44
3	40	700
4	51	8,500
5	65	>10,000
6	150	>20,000

TABLE 3
Water-Repellence of Poplin Bearing Various Amounts of Water Repellent

Repellent and percent applied	Air Permeability $ft^3/(min. \times ft^2)$	Spray Rating	Absorption, Static Immersion Test %	Resistance to hydrostatic pressure cm	Drop-Penetration Times sec.
Durable	6.5	100	15.8	36.5	146
Nondurable 3.5%	5.6	90–100	18.5	28.3	119
Nondurable 2.5%	5.4	80–90	18.9	28.1	97
Nondurable 1.2%	6.2	80–90	18.7	27.7	70
Nondurable 0.25%	5.1	0–50	27.2	0 to 15	17
No repellent, laundered	6.4	0	43	0	6

TABLE 4
Comparison of Results Obtained with Bundesmann Tester and Drop-Penetration Apparatus[a]

Sample	Drop-penetration time min.	Penetration in Bundesmann test ml./10 min.
5092	2.4	8
1651	7.2	7
1649	7.4	2.5
4046 P.	16	0
1650	24	0
4046 W.R.	31	0

[a] It should be noted that the drop-penetration time represents the time required for 10 ml. of water to penetrate the sample, while the results of the Bundesmann test are expressed as the number of ml. of water that penetrate in 10 minutes. There is therefore an inverse relationship between the two sets of results.

TABLE 5
Comparison of Results with Drop-Penetration Test (Hard Backing) and Du Pont Rain Test

Sample No.	Description	Drop-Penetration Time min.	Summation of Average Leakages at 2, 4, 6, & 8 feet. Grams
1	Tent duck, treated	>480	0
2	Tent duck, gray	210	0.5
3	Jungle cloth	85	.9
4	Tent duck, treated	75	11.7
5	Oxford cloth (9481)	60	1.3
6	Oxford cloth (8891)	50	1.5
7	Oxford cloth (9481A)	28	1.0
8	Tent duck, gray	13	42.9
9	Oxford cloth (9482A)	7	49.4
10	Shelter tent duck	6	57.5
11	Shelter tent duck	5.3	25.7
12	Poplin	3.4	47.7
13	Sateen	2.7	49.0

TABLE 6

Comparative Properties of Fabrics Subjected to 18 Weeks of Field Wear and Three Launderings, and Fabrics Subjected to Three Launderings Only

Finish No.	Air Permeability ft³/(min. x ft²)	Spray Rating	Hydrostatic pressure value cm	Drop-penetration Time sec.
a. Field Wear Plus Laundering				
1	6.2	80+	24	95
2	6.1	80—	24	55
3	6.4	60	19	40
4	6.5	80	21	55
5	6.1	70+	21	45
6	5.1	80+	22	80
7	4.4	80	22	75
8	6.0	80—	24	65
9	4.8	80—	22	100
b. Laundering Only				
1	6.3	100	28	75
2	5.4	100	32	50
3	7.0	80—	20	35
4	6.4	70	20	35
5	5.5	80—	20	30
6	5.2	100	32	90
7	5.6	90	33	60
8	5.6	90—	24	40
9	5.9	100	27	100

with soft backing are given in table 6.[7] The results are for a poplin sample treated with nine different durable water repellent finishes. The upper portion of the table gives the drop-penetration times (soft backing) for these fabrics after they had been subjected to 18 weeks of field wear in the form of jackets. Values of the spray ratings, air permeabilities and hydrostatic pressure resistances are included for comparison. The lower portion of the table describes similar results for the same fabrics after three launderings in the laboratory. The results show that there is good correlation between the several types of test. Thus, finishes 1, 6 and 9 withstood the effects of either field wear or laundering better than the others, while finishes 3, 4 and 5 were consistently poorest. The results also reveal the interesting correlation between the effect of field wear plus laundering, and laundering alone. This question will be treated in detail elsewhere.

[7] For both the soft and hard backing tests, the coefficient of variation of the drop-penetration times is approximately 35 per cent, and the corresponding standard error of the mean is about 10 per cent. The variability of the results depends in large measure on the uniformity of the test specimens.

The range of usefulness of the drop-penetration apparatus is greatly extended by the use of a hard backing, which permits the study of relatively impermeable fabrics. The use of the hard backing markedly increases the severity of the test. Some representative results obtained with this type of backing are given in table 7. The data refer to samples of sateen and oxford cloth treated with three different finishes, initially, after laundering, and after dry cleaning, respectively. The results of other tests for water repellency are included for comparison. The data suggest that the drop-penetration test is in general more sensitive than the others, although with one exception, the correlation between the hydrostatic pressure, spray rating, dynamic absorption, and drop-penetration tests is fairly good. The hydrostatic pressure values of the dry cleaned samples were consistently only slightly lower than those of the samples as received, despite the fact that the dry cleaning seriously affected the repellency as measured by the other tests. This result confirms the viewpoint that no one test should be relied upon to evaluate a water repellent material.

V. CONCLUSION

A description has been given of a drop-penetration apparatus suitable for evaluating the resistance to hard rainfall of cotton flat fabrics. The results obtained with this device correlate well with those obtained in hard natural rain. Some typical results obtained for cotton flat fabrics are presented, and the relationships between the results obtained with this apparatus and some other measures of water repellency are discussed. It is shown that tests of the resistance to hydrostatic pressure may provide an erroneous estimate of the resistance of a fabric to penetration by falling drops.

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ACKNOWLEDGMENT

Figure 1 was provided through the courtesy of the Philadelphia Quartermaster Depot. Captain S. Backer and Mr. M. Landsberg of that organization contributed materially to the design and construction of the mounting of the drop-penetration test with hard backing.

UNEMPLOYMENT REGISTER

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See page P306

TABLE 7

Comparative Properties of Fabrics Treated with Different Finishes, Initially, After Laundering and After Dry Cleaning

Finish No.	Air permeability ft³/(min. x ft²)			Hydrostatic pressure value cm			Spray Rating			20 minute Dynamic Absorption value %			Drop-penetration time min.		
	Initial	Laundered	Dry cleaned	Initial	Laundered	Dry cleaned	Initial	Laundered	Dry cleaned	Initial	Laundered	Dry cleaned	Initial	Laundered	Dry cleaned
A. Sateen															
a	3.0	4.6	4.1	49	30	43	100	80	70	26	28	50	18	4	3
b	3.3	5.1	4.9	48	31	41	100	80	70	17	32	28	14	5	3
c	3.4	5.0	5.2	42	21	42	100	80	80	20	48	23	18	3	7
B. Type I Oxford															
a	2.5	2.6	3.2	42	30	39	100	80	70	28	32	42	14	5	4
b	2.1	2.0	2.4	57	39	53	100	80	70	16	25	22	24	7	4
c	2.0	2.4	2.3	47	18	41	100	80	70	26	38	34	22	4	9

Review of Recent

DEVELOPMENTS IN PRINTING*

DR. PAUL L. MEUNIER

Technical Laboratory, E. I. du Pont de Nemours & Co., Inc.

I. NYLON PRINTING

1. Acid and Direct Colors

THE textile printing industry is to be congratulated for its part in supplying our armed forces during the war with nylon camouflage parachute cloth having satisfactory physical properties and fulfilling the Army's strict fastness requirements. The choice of dyes for meeting those fastness requirements was limited to the acid and direct color classes. Vat colors are also suitable for printing nylon, but they failed to meet the light fastness requirement for reasons which will be discussed below.

Nylon is chemically similar to wool in that it contains free amino groups and amide groups. The similarity extends further to its affinity for acid colors and direct colors. Undoubtedly, the acid colors attach themselves to wool and nylon through some sort of salt formation with the amino groups. The printing of nylon, however, differs from that of the coloration of wool because in addition to the requirement for affinity for certain colors, the fiber must be "opened-up" or swollen so that colors may find their way into the fiber. In the early stages of the development of nylon printing with acid and direct colors, it was found that certain groups of colors could be printed with urea or hydroxy acetic acid or a mixture of urea and the acid. These materials are deflocculating agents, and they maintain a distribution of the color in such a particle size range that they are absorbed in the fiber when it is swollen during steaming.

In respect to the importance of particle size and swelling on the printing of nylon, the process is somewhat similar to the printing of viscose with acid and direct colors. Here, too, entrapment of the color particles in the fiber is an important part of the fixation process. Entrapment probably also accounts for the excellent wet fastness properties of many colors in these classes.

2. Vat Colors

The statement was made above that the vat colors are suitable for the printing of nylon. This is certainly true in regard to affinity and wet fastness. In general, the vat colors produce fairly bright, strong shades on nylon which withstand rigorous laundering tests, and they are fast to wet and dry crocking.

The weakness of this group, however, is its relatively poor fastness to light compared with the high order of fastness characteristic of these colors when applied to cellulosic fibers. Certain of the blue and green members of the class, e.g., Leucosol Blue G Double Paste and Ponsol Jade Green Double Paste do have good light fastness. These colors undergo only a noticeable change after 60 hours exposure in the Fade-Ometer. On the other hand, the yellows, oranges, reds and even the usually light-fast browns and olives are of a much lower order of light fastness on nylon than on cotton. Outstanding examples are Sulfanthrene Pink FF Paste and Leucosol Yellow GC Paste which show appreciable fading within five hours exposure.

Recently the claim has been made in patent literature that cottage steaming of vat color and Indigosol prints brings about greatly improved light fastness. These claims have been found to be true, but they must be taken with reservation for the following reason: As they are usually applied, the vat colors are in a fine state of dispersion in the nylon fibers. After the conventional rapid ageing, cottage steaming of the prints for 45 minutes at 25 pounds pressure per square inch, as stated above, greatly improves the light fastness. The effect of this steaming is to swell the fiber, allowing the finely dispersed vat pigment to aggregate and, as the steaming continues, aggregation increases even to the point where some of the color is forced to the surface of the fiber. Actually, tiny crystalline particles of the color can be observed on the surface under the microscope. Consequently, the crocking fastness after cottage steaming is very poor. It appears, therefore, that the nylon fiber is so highly oriented (drawn) that there is too little room for the color to aggregate as it does in cellulosic fibers, thus preventing the dyes from exhibiting their normal light fastness. In view of these observations, care should be taken to investigate the rubbing fastness of vat color prints on nylon which are reputed to have superior light fastness.

Attempts have been made to improve the light fastness of vat colors on nylon by resorting to still other means, for example, introduction of ultraviolet absorbing materials into the fiber or into the printing paste. These materials, some of them similar to the active ingredient of suntan lotion, have been found to protect the color for only a short time. The protection lasts just as long as the ultraviolet absorbing material remains under light exposure. With Sulfanthrene Pink FF Paste, 2 percent of the protective material in the printing paste brings about an increase in light fastness of about two hours Fade-Ometer exposure.

II. APPLICATION OF PAD STEAM PROCESSES TO PRINTING

1. Pigment Print-Chemical Pad-Steam Process

The name of this process reveals its nature and its similarity to the Pad Steam Process for dyeing with vat colors. It is also similar to the old Colloresine Process and the Electrofixierer method. All of these involved printing the vat color with a thickener, drying and then padding in a solution containing caustic and sodium hydrosulfite, followed by steaming. The present method differs from the older processes in that no gum is used in the chemical pad solution, and air-free steam at 212° F. or slightly above is used.

It has been demonstrated that vat color prints can be produced continuously by this method in light and medium shades. The strength and brilliance are excellent and, in these shades, the detail is quite satisfactory. However, heavy shades have not been produced successfully by this method, primarily because of flushing of the color into the unprinted areas. This results in fuzzy lines and poor detail. It is expected that the method might prove of considerable interest for light and medium shades, and, perhaps, some of the heavier shades in prints of 80-90 percent coverage.

*Presented at Tenth Anniversary Banquet, Textile Printing Colorists Guild, Alexander Hamilton Hotel, Paterson, N. J., February 28, 1946.

2. Development of Aged Prints by the Pad Steam Process

It is well known that in the printing of heavy goods such as draperies, it is quite difficult to obtain maximum color value with certain dyes. In other words, the colors are not completely fixed by a single passage through the rapid ager, and they bleed off during the subsequent soaping operations and stain the whites.

It has been found that by drying the aged prints and then passing them through a chemical pad solution of caustic and hydro followed by a short steaming (10 seconds) much improved results are obtained. Color value in some instances is noticeably better, while the brightness of all the colors is improved. Of most interest is the fact that there is no bleed-off during oxidation and soaping, and the result is cleaner whites.

A much improved printed article is obtained by this method, but it remains to be seen whether its technical advantages will offset the expense of the additional ageing.

3. Overdyeing Resist Prints by Reduced Pad Steam Process

Printed articles containing a white resist and vat colors often are overdyed with a light shade of vat blue, tan, gray and green. The process involves printing the white resist and then the vat color in small objects or stripes and then overdyeing by padding the reduced vat color solution followed by treatment in a soda ash and hydrosulfite bath for about ten seconds. The time of development in the soda ash "booster" is limited to ten seconds in order to preserve the white resist. This limited time in the developing bath is not sufficient to obtain good fixation of the vat dye. Laundering fastness of dyeings produced by this method is inferior to other methods of dyeing. The new process involving Pad Steam application consists merely of substituting a short steaming operation (ten seconds) for soda ash booster. The steps are: (1) print white resist and vat color, (2) rapid age, (3) dry, then (4) pad with reduced vat color, and then (5) immediately steam ten seconds. This process yields excellent laundry fastness of the ground shade, and, at the same time, it preserves the white resist.

The advantages of the process are obvious. Large booster baths are eliminated and an improved printed article is obtained.

SUMMARY

Certain recent developments in printing have been discussed, including practical and theoretical aspects of nylon printing and applications of the Pad Steam principle to fixation of vat colors.

The Special Characteristics of a Self-Scouring WOOL LUBRICANT

A. MOSCOWITZ

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UNTIL quite recently the general concept of the function of a wool fiber lubricant has been the traditional one, viz: to assist the fiber in all its tortuous mechanical processing and then let the processor worry about its removal after its work has been done.

The latest development in wool lubricants has for its purpose the continuance of its functional properties in the subsequent wet processing such as fulling, scouring and dyeing. By its very nature such a lubricant should possess surface-active characteristics. If it does, the possibility of its being self-scouring is not remote.

Compounds having surface-active properties are plentiful, as are good wool fiber lubricants. But compounds exhibiting good lubricating properties as well as surface activity are not plentiful at present. However, the latest development in this field does combine surface actvity with excellent lubricity.

In general, wool lubricants have been oleophilic in nature, depending upon emulsification for their dispersion in an aqueous medium. Such dispersions invariably tend to break on the fiber and the lubricant remains on the surface as an oily layer. The lubrication supplied by this oily layer is, to a varying degree, sufficient for carding and spinning, but it leaves much to be desired in the way of penetration, stability and uniformity of application. Furthermore, its function ceases at this point.

From the point of view of lubrication alone—and it must be borne in mind that the paramount need is lubrication—greater effect can be obtained with a lubricant which is soluble in water and has wetting properties.

However, lubrication without cohesion of the wool fiber is of questionable value. With an oily material having the right viscosity excellent cohesion can be obtained.

While most of the conventional lubricants have a viscosity of about 200 secs. Saybolt, Universal at 100° F., it has been found that higher viscosities are even more effective in imparting better cohesion to the fibers. The ideal wool lubricant would then be one which has a high viscosity, within the range of practical application, is soluble in water, and exhibits surface-active properties so that it will wet the fibers.

It is understood that under no conditions may the lubricant be tacky or exhibit gumming properties, since that would be disastrous in the carding operation.

The newly developed wool fiber lubricant referred to above, having a viscosity of about 400 secs. Saybolt Universal at 100° F., exhibits the above-mentioned desirable properties. Mill practice has borne out its effectiveness. All the mechanical processing steps are facilitated, from application in the picker through carding and spinning of the yarn.

The resultant yarn is invariably stronger than yarns produced with conventional lubricants. In most cases the tensile strength is increased by about 20 per cent.

Now we come to wet processing and we start with fulling of piece goods. For the most effective operation in the fulling mill, the fiber must be highly receptive to water and the fulling medium must reduce inner friction of the yarn as well as outside friction against machine parts.

Soap has been used for a long period of time as the fulling medium, while oils have seldom, if ever, proved satisfactory. As far as the general run of wool oil is concerned, they have in most cases tended to counteract the water receptiveness of the fiber.

The new wool fiber lubricant, however, makes an excellent fulling medium due to its high viscosity, stability and wetting as well as detergent properties. Fulling time is not reduced, but excellent coverage and normal shrinkage are obtained without the aid of soap. Merely the assistance of a small amount of a mild alkali, such as soda ash, is required, and the lubricant that is applied in the picker acts as the fulling medium.

To be self-scouring the lubricant must be able to maintain its original surface-active properties, as well as its solubility in water, throughout all the processing steps. The detergent properties of the new wool lubricant are further brought

into play at this stage. By running the fabrics in a low bath of plain warm water in the dolly washer for a short period of time and then rinsing, this lubricant is washed out to a low residual oil content. No scouring aid is required.

Where the self-scouring type of wool oil described above is used on virgin wool or on blends, the self-scouring feature is not impaired. Such blends may consist of wool and cotton, wool and rayon, or in a weave consisting of wool filling and cotton warp. But where garnetts, which usually contain a high oil content, are used in a blend, the self-scouring lubricant cannot be expected to carry a large proportion of foreign oil in the scouring. In such cases it has been found that where up to about 35 per cent of the total oil on the blend was foreign oil and the remaining 65 per cent was the new wool lubricant, good scourability was still obtained with plain water.

The same type of self-scouring lubricant can be used in the manufacture of worsted yarn. In a representative mill run, 2 per cent of the oil was applied in the combing, giving sufficient lubrication for good combing. It was noticed that the top did not have the tendency to dry out as did tops combed with a conventional lubricant.

Top dyeing in the oil was done satisfactorily and the dyed top seemed to have a brighter shade than usual.

In the drawing operation good drafting was obtained with and without the addition of oil. In cases where no further oil was added, the sliver was merely moistened with water.

From the foregoing it is quite apparent that a self-scouring wool lubricant as described has many excellent features to recommend it. The improved and more efficient processing, from picking through spinning, fulling, scouring and dyeing, and the savings in soap and detergents which it affords, should in time make it indispensable to woolen and worsted mills.

ABSTRACTS FROM CONTEMPORARY JOURNALS

SOME USES OF CALCIUM ALGINATE RAYON

A. Johnson and J. B. Speakman, Journal of the Society of Dyers and Colourists, page 97, Vol. 62, No. 4, April, 1946.

Although insoluble in water, calcium alginate rayon is readily dissolved by such dilute solutions of soap and soda as are normally used in the piece scouring of wool textiles. It can therefore be used to produce "disappearing fiber" effects with all types of textile fibers. A classified survey of its use in this respect follows:

Binding Agent—Calcium alginate rayon may be used as a binding agent to hold down the projecting fibers of a hairy yarn during weaving or knitting and afterward removed by a simple scour with soap and soda thus releasing the long fibers to give a definite character to the cloth. It can also be used as a temporary core or binder in a fancy yarn composed of core, effect and binder threads.

Supporting Thread—By using the correct twist in doubling calcium alginate rayon with other yarns, it is possible to obtain twofold yarns in which the alkali-resistant component is exactly twistless. When such yarns are used as warp and filling, a twistless fabric is obtained after the alginate is removed in scouring.

Carrying Agent—Yarn coiled around an alginate core could be woven as warp and filling in combination with yarn in its straight form, a crepe being formed when the alginate is dissolved, and the coils released, in subsequent scouring. Similar processes can be employed to obtain abnormal loops for the production of pile fabrics, elimination of "cracked ends" caused by the breaking of cotton striping ends at some stage of processing in the manufacture of fancy worsted suitings, interweaving intermittent tufts for ornamentation, and as a basic fabric upon which the stitches of an interlocked embroidery pattern are superimposed.

Spacing Agent—Introduction of calcium alginate rayon into warp and filling and later removed by scouring may produce a missed thread effect. It can also be adapted for modifying the structure of cloth to produce a pile.

Agent for Ornamentation—Calcium alginate rayon, or alginic acid, may be utilized in conjunction with other yarns to produce ornate structural effects by printing predetermined areas with agents capable of making the rayon alkali-resistant and then scouring to remove the untreated rayon.

Bonding Agent—When calcium alginate is treated with a dilute solution of sodium carbonate, it softens, swells, and ultimately dissolves. Since the swollen alginate can be hardened and made alkali-resistant by means of basic chromium acetate, basic beryllium acetate, or acid formaldehyde, it can be introduced into a fabric to serve as bonding agent.

EDUCATION AND THE BLEACHING, DYEING, PRINTING AND FINISHING INDUSTRIES

A. W. Doyle, Journal of the Society of Dyers and Colourists, page 101, Vol. 62, No. 4, April, 1946.

It was pointed out that a course in textile chemistry should be of four years duration. The last year should be devoted to practical work and reading, with a minimum of lectures. During the final year one or more problems should be studied so that students may develop the ability to carry out investigations, become acquainted with the various sources of information, and gain an insight into the best methods of presenting reports. A sound grasp of inorganic, organic and physical chemistry, mathematics and physics is of first importance. In addition it is necessary to have a specialized knowledge of the chemistry and physics of textile materials, and the theory and practice of bleaching, dyeing, printing and finishing. German, general engineering, and the study of yarn and fabric construction are other valuable subjects. Firms which constitute the textile wet processing industries should provide an opportunity for students to spend a portion of their time in the plants. Short periods of time should also be spent in research institutions.

THE FORMATION OF HYDROGEN PEROXIDE DURING THE OXIDATION OF REDUCED VAT DYES

W. Atherton and H. A. Turner, Journal of the Society of Dyers and Colourists, page 108, Vol. 62, No. 4, April, 1946.

An experimental method is described for the catalytic reduction of anthraquinone and anthraquinonoid vat dyes by which the sodium salt of the reduced form is obtained free from the oxidized form and from other impurities. Evidence is given that, when the leuco-compound so obtained is reoxidized by air or by sodium hypochlorite, one peroxide group is formed for each reduced quinone group oxidized. The quantitative relation between reduced quinone groups reoxidized and peroxide groups formed seems to be independent of the tendering activity of the dye.

SOME EXPERIMENTS ON THE DYEING OF NYLON YARN

J. Boulton, Journal of the Society of Dyers and Colourists, page 65, Vol. 62, No. 3, March, 1946.

Part I is summarized as follows:

Direct dyes which remain in solution

in an acidified bath, as most do, can be dyed on nylon yarn at rates comparable with those of the same dyes when dyed on viscose rayon yarn from a neutral bath. In the absence of acid, nylon yarn absorbs direct dyes much more slowly than does viscose rayon. The rate and equilibrium absorption of direct dyes by nylon yarn is dependent upon the pH of the dyebath. Increase of dyeing temperature increases the rate of absorption of both direct dyes and acid dyes and decreases the equilibrium absorption. With direct dyes, neutral salts raise the rate and degree of dyebath exhaustion from a neutral bath and decrease both in an acid bath; the latter behavior is also shown by acid dyes on wool or nylon. Nylon, like wool, has an acid-binding capacity which increases with the mol. wt. of the acid for a series of organic sulfonic acids, and is lower than that of wool. Nylon yarn dyed with direct dyes exhibits dichroism when examined in polarized light. Some acid dyes produce dichroism on nylon and some do not. All of the above facts are accommodated if a dual behavior is attributed to nylon, viz. that its union with dye may result from (a) the formation of a salt link as with wool and/or (b) the exertion of residual valency forces as with cellulose.

Part II is summarized as follows:

The fastness to washing and light of nylon dyed with acid dyes, direct dyes, cellulose acetate rayon dyes, and chrome dyes has been compared directly with that of viscose rayon, cellulose acetate rayon, and wool. Recommendations as to the potential usefulness of different classes of dyes are made. Direct dyes do not cause appreciable degradation of nylon when the dyeings are exposed. Vat dyes cause extensive degradation, which takes place more rapidly than is the case with cellulosic fibers and is accompanied by similarly rapid fading of dye. Whereas fading of dyes occurs in the presence or absence of oxygen, an atmosphere containing oxygen is essential for photodegradation of the fiber.

DETERMINATION OF IODINE ON CLOTH TREATED WITH ORGANIC IODINE COMPOUNDS

Solomon Frankfurt, Textile Research Journal, page 130, Vol. XVI, No. 3, March, 1946.

This paper describes a new method for the determination of iodinated organic compounds on cotton fabrics. The compounds are removed from the cotton, brought into solution, and the iodine content of the solution estimated. The presence of ammonium vanadate as a catalyst, and the subsequent use of sodium bisulfite, make possible the conversion of the iodine of organic compounds to its ionic form. To determine the iodine on cotton cloth treated with organic iodine compounds the cloth is boiled with 10 per cent sulfuric acid for 25 minutes and the solution is treated in the same manner as a solution of an organic compound.

TRADE NOTES • NEW PRODUCTS

OBITUARY

NICHOLAS B. BROWNE

Nicholas B. Browne, salesman of the Boston Branch of the General Dyestuff Corporation of New York, N. Y., died suddenly at his home, No. 32 Slocum Road, Cambridge, Mass., on Saturday, May 11, 1946. He was born October 31, 1896 at Pawtucket, R. I.

He graduated from Brown University where he majored in Chemistry. In the First World War he served with the Armed Forces in France. Following his discharge from the Army, he spent about two years in practical experience in cotton printing, and then joined Kuttroff, Pickhardt & Company, predecessors of General Dyestuff Corporation, where he specialized in vat dyestuffs, both for dyeing and printing. In 1925 he was transferred from New York to the Boston branch of General Dyestuff Corporation, and was a valued member of its sales organization for over twenty years.

• LOWELL TEXTILE ALUMNI REUNION

A victory reunion and banquet of the Lowell Textile Institute Alumni Association was held on May 18th at the Boston City Club, Boston, Massachusetts. Approximately 250 attended.

Guest of honor was President Emeritus Charles H. Eames who retired as president of the Institute a year ago. He was presented with a watch by the association.

The new president, Kenneth R. Fox, spoke on future plans of the Institute regarding courses, equipment, and method to be followed in limiting the enrollment in the next year to the capacity of the school.

A report was heard from the chairman of the building committee of the board of trustees on the proposed plans for new dormitories and recreation building.

J. Milton Washburn '21, Emery Industries, Inc., was elected president for the coming year.

• NEW SITE FOR PHILADELPHIA TEXTILE

Colonel Millard D. Brown, President of The Philadelphia Textile Institute Foundation announced recently the purchase of a twelve and a half acre tract at School House Lane and Henry Avenue, Germantown, as the site for the proposed new Philadelphia Textile Institute.

Theodore B. Haywood, chairman of the Philadelphia Textile Institute Foundation Building Committee stated that the site, formerly known as the Kolb Estate, was purchased from Isaac D. Levy at an amount approximating $100,000.00. He further stated that it is spacious enough to permit the erection of a modern textile school and dormitories as well as provide for a sports field and future expansion.

The Philadelphia Textile Institute, the oldest textile school in the country, was established in 1883 and for 10 years was housed at 1336 Spring Garden Street. In 1893 the Philadelphia Museum of Art with whom the Institute is associated purchased the building at Broad and Pine Streets, in which the school is still housed. This building, part of which was originally built in 1827, was later enlarged, but no additions have been made in the past 68 years.

For a number of years the present building has been inadequate both from the standpoint to properly house the machinery and equipment and to meet the ever increasing influx of students.

• JOINS BICK & CO.

Morton H. Wertheim, formerly superintendent of dyeing with National Hosiery Mills, Indianapolis, Indiana will represent Bick & Co., Inc., Reading, Pa. manufacturers of dyestuffs and specialties, in the middle West.

• AVCODISK AND AVCOSEW

Two new synthetic lubricants called "Avcodisk" and "Avcosew," for treating yarns and sewing threads, have been developed by the Textile Research Department of American Viscose Corporation. These materials will be manufactured and sold by the Atlas Powder Company of Wilmington, Del.

"Avcodisk" is a synthetic wax treatment for lubricating all types of yarn where softening and anti-static properties are required. It is stated that extensive tests have shown decided improvement in knitted fabrics produced with a low percentage application of this material. More uniform stitch formation, better recoverability and greater softness of fabric are said to

result from its use. "Avcodisk" is manufactured to maintain a high degree of uniformity when applied to yarns under normal conditions.

The name "Avcosew" is applied to a new range of synthetic lubricants to be used for treating sewing thread. These materials can be applied by any of the various methods now used in this field such as solvent, water emulsion, disc and hot melt. It is claimed that they have produced excellent sewability under difficult mill conditions where high-speed sewing is required.

While Atlas Powder Company will manufacture and sell these products, they will be serviced by the Textile Research Department of American Viscose Corporation.

• ADDITION TO JACKSON LABORATORY

Construction of a new addition to Du Pont's Jackson Laboratory at Deepwater Point, N. J., will begin soon, J. M. Tinker, director of the laboratory, has announced.

The new section, 216 feet long and 52 feet wide, will be a two and one-half story building of reinforced concrete with a brick veneer to be erected at an estimated cost of approximately $600,000.

The new wing will provide additional office space, 15 new laboratory rooms for individual research, and space for increased library facilities, Mr. Tinker said. Change house facilities, a storeroom, and a receiving and shipping room will be located in the basement.

This addition to the Jackson Laboratory, already one of the largest organic chemical research laboratories in the world, will increase the laboratory's facilities for coping with the many problems anticipated in this postwar period.

• JOINS HEYDEN

Geo. F. Kahle, 1938 Chemical Engineering graduate of Illinois Institute of Technology, joined Heyden Chemical Corporation May 1st as a representative in the Chicago area.

During the past three years he was associated with the Office of the Chief of Ordnance handling production safety in munitions manufacturing plants. Earlier he was in the employ of Lithgow Corporation as a member of its sales engineering and development staff.

• BRADFORD DURFEE NAME CHANGED

On May 1, Governor Maurice J. Tobin signed the bill changing the name of the Bradford Durfee Textile School to the Bradford Durfee Technical Institute. The Institute gives three year integrated curricula on the college level in the fields of Engineering, Science and Textile.

Announcement of the appointment of Dr. John B. Lyons as Head of the Science Department has been announced by the Trustees of the Bradford Durfee Technical Institute. Dr. Lyons holds A.B., A.M. and PhD. degrees from Harvard University. As an undergraduate he was elected to Phi Beta Kappa. He was an instructor at Harvard for two years before entering military service.

• NEW PRODUCTS SECTION, HERCULES

Walter E. Gloor, plastics supervisor at the Parlin, N. J., plant of Hercules Powder Company, is heading a new products development section of the company's Cellulose Products Department in Wilmington, Del.

Courtland K. White, formerly in charge of chlorinated rubber production at the Parlin plant, is now plastics supervisor there. The change became effective June 1.

Besides Mr. Gloor, the new products development section includes several chemists who will work with the Cellulose Products Department research group at the Hercules Experiment Station outside Wilmington. They will develop new cellulose compounds, introduce them to industry and investigate their market pontentialities. Mr. Gloor will supervise development work done by the section.

Products which show promise will be developed further and put into full-scale production.

• CHEMICAL EXPOSITION

The Fourth National Chemical Exposition will run concurrently with the semi-annual meeting of the American Chemical Society to be held in Chicago September 9 to 13. It is announced that the show, again sponsored by the Chicago Section of the ACS, will be held at the Chicago Coliseum from September 10 to 14.

• 1946 FALL WOOLEN AND RAYON CARDS

The regular editions of the 1946 Fall Woolen Card, featuring Winter Tints, Autumn Pastels and Colors of the Tropics, and the 1946 Fall Rayon Card, featuring Jewels of the Orient and Holiday Hues, have been issued to members of The Textile Color Card Association. Confidential swatches of these new colors were previously sent to the organization's membership.

• DELTA KAPPA PHI CONVENTION

The first post war convention of Delta Kappa Phi Fraternity was held recently at the Fox and Hounds Club in Boston, Mass. Reports were presented by officers and chapter delegates. Success was shown in finances, reorganization and future prospects of active chapters, and in the number of life memberships.

The following officers were re-elected: John Foster, Supreme Consul, assistant to the head of the mechanical department, New Bedford Textile Institute; Francis Tripp, Supreme Pro-Consul, head of the chemistry department, New Bedford Textile Institute; Eliot Borden, Supreme Custodian, chemist of the Revere Copper and Brass Co., and Kenneth Tripp, Supreme Annotator, assistant foreman at the Morse Twist Drill and Machine Co.

It is requested that correct mailing addresses be sent to Kenneth S. Tripp, 289 Allen Street, New Bedford, Massachusetts.

• EUROPEAN MARKET FOR CEGLIN

"Ceglin" textile finishes, developed in this country during the war, will be introduced soon in European markets, according to Sylvania Industrial Corporation.

Dr. Worth Wade, patent attorney for the company, has already gone to London, where he will open negotiations with English manufacturers, and, in addition, he will visit Holland, Belgium, France, Switzerland, Italy and Sweden to arrange for the manufacture of the new products there.

In addition to licensing "Ceglin" abroad, Dr. Wade will also make arrangements for the licensing of other cellulose ethers and additional products developed by the company.

• AMERICAN VISCOSE LICENSEE

The American Viscose Corporation announces the appointment of the Gem Dyeing & Finishing Corporation, Paterson, N. J., as a finisher licensee under the "Crown" Tested Plan. The new licensee is fully qualified to dye and finish rayon fabrics in accordance with the requirements of the "Crown" Tested Plan.

• MILTON KUTZ RETIRES

Milton Kutz, whose career in the chemical industry ranged from office boy to executive positions, has retired from the Du Pont Company.

Until December, when he decided to retire, Mr. Kutz was assistant general manager of Du Pont's Electrochemicals Department.

Forty-nine years ago, Mr. Kutz joined the Roessler and Hasslacher Chemical Company as an office boy. In 33 years he rose to vice president and director of the firm. When Roessler and Hasslacher was acquired by Du Pont in 1930, he became director of sales. In 1933, he became assistant general manager of the department.

Mr. Kutz is a native of Logansport, Ind., and was educated in New York public schools. He is widely known in the electrochemicals field, for he had long worked as a salesman in the New York, New

Jersey, and Pennsylvania area. In 1922, he became general sales manager of Roessler and Hasslacher and from 1928 to 1930 he was vice president and manager of sales.

Prominent in Jewish affairs, Mr. Kutz has been president of the Jewish Federation of Delaware for seven years. He is a thirty-second degree Mason, a member of the American Chemical Society, and the Chemists Club of New York. He is married and lives at 2600 West Sixteenth Street, Wilmington.

• GERMAN SYNTHETIC FIBERS

Three major developments in the exploitation of the German synthetic fibers industry were announced by John C. Green, Executive Secretary of the Office of the Publication Board, Department of Commerce.

(1) The first members of an industry group have left for Germany to collect technical information for American manufacturers.

(2) A 1,000-page report, compiled by the synthetic fibers mission which visited Germany last fall, was released by OPB. The report will be published in book form in about three months.

(3) OPB will cooperate with American textile firms interested in sending technicians to Germany on special missions.

The industry group now leaving expects to spend from six to ten weeks in Germany and Austria, visiting plants and laboratories. Earlier investigators provided a general survey of the German industry. The present group includes engineers and draftsmen, and plans to bring back working drawings of German machinery as well as full details on equipment and processes described in earlier reports.

William D. Appel, Chief, Textile Section, National Bureau of Standards, will head the group.

• FUTURE CHEMICAL MARKETS

Germany again may become a threat to the peace of the world if permitted to rehabilitate its chemical industry and retain plant facilities to provide munitions, Harry L. Derby, President of the American Cyanamid & Chemical Corp. and wartime President of the Manufacturing Chemists' Association of the United States, told the Annual Meeting of the association in his retirement speech at Skytop, Pa., on June 6th.

"According to authoritative information" Mr. Derby said, "the (German) I. G. Farbenindustrie's current production in the American zone is now no more than 20% of capacity because of lack of fuel, transportation and raw materials but not because of lack of capacity, equipment and facilities or lack of personnel. . . . Recently it was proposed by a group of English manufacturers that the German chemical industry be permitted to resume production for a temporary period, not only for domestic consumption, but also for export in order to re-establish quickly the finances of Germany. If such a proposal were carried out it is most improbable that at some later date those chemical plants would be either dismantled or destroyed . . . which would inevitably result in Germany being able again to wage war."

Mr. Derby also pointed out that Russia had seized many of the newer German plants built during the war, and that Russia also must be considered in contemplating future world chemical markets. Mr. Derby said that with the high labor and other costs in the United States it will be practically impossible to compete in world chemical trade against the low labor costs of Russia, Germany and other European countries. Mr. Derby also stressed the importance of the American chemical industry in national defense, and stated that approximately fifty-five million dollars per annum was being spent on American research, and that the post-war expansion program of the chemical industry probably would be in excess of half a billion dollars.

"The progress of the chemical industry will be inter-related to that of the Nation as a whole," Mr. Derby concluded. "At no time has this country had greater opportunities for service and advancement. The next few months will determine whether we are to avail ourselves of these opportunities. If we follow the lead of the impractical theorists, and those who seem more interested in their individual futures (dictated by political expediency and selfish considerations), the nation's progress most certainly will be arrested. If, on the other hand, sound judgment is exercised and those in political authority have the courage to carry out their responsibilities without regard to influence from pressure groups, or the applause of organized minorities, our country should resume its traditional advance and continue as the leading nation of the earth."

• RAYON SEMINAR

A week-long "Advanced Seminar on Rayon" for deans and instructors from eight of the country's leading textile schools commenced on June 3rd at American Viscose Corporation's Textile Research Department at Marcus Hook, Pa. Forty delegates attended the meetings, which covered every major phase of processing rayon, both filament yarn and staple fiber, and the use of rayon in all textile fields.

The seminar was conducted under the auspices of the Textile Research Department's Educational Branch, headed by Joseph A. Truitt. Comprehensive study material covering the handling of rayon on the cotton, worsted and woolen systems and the weaving, knitting, dyeing and finishing of rayon fabrics, was prepared by members of the department's staff and in addition lectures were given by a number of American Viscose Corporation's research men.

The need for a seminar of this type became apparent during the war years as a result of the accelerated development of rayon and of rayon processing techniques. Members of American Viscose Corporation in close touch with these developments believed that a plan should be worked out whereby students, in the early post-war classes of the country's textile schools, could be offered an up-to-date presentation of rayon's new position in the textile world.

Because of two wartime situations, the textile schools found it extremely difficult to keep pace with new developments of rayon itself and its very rapid expansion in both new and older fields. Many of the schools were expending their whole effort on specialized war requirements and training programs. The second difficulty, even more effective, was the wholesale loss of instructors and their students to the armed forces.

At the suggestion of Edward T. Pickard, secretary of the Textile Foundation, the deans of the leading textile schools were consulted and asked for suggestions regarding the solution of the problem. The deans requested that instructors and professors of their respective institutions be offered advanced courses in rayon, including all textile fields, by the staff of the Textile Research Department.

The schedule of lectures given at the seminar was as follows:

Monday, June 3:

"Research Spins a Yarn"—Graeme G. Whytlaw, assistant manager, Textile Research Department.

"Rayon—Its Historical Background"—Dr. F. Bonnet, adviser to the president.

"History of Rayon Fabrics"—Rene Bouvet, head of textile development branch, Textile Research Department.

Tuesday, June 4:

"Plant and Customer Relations"—F. F. Long, manager, Marcus Hook plant.

"Rayon at Marcus Hook"—I. P. Davis, chief plant chemist, Marcus Hook.

Wednesday, June 5:

"Rayon Fabric Effects"—Rene Bouvet, Textile Research Department.

"The Washington Viewpoint"—Francis E. Simmons, manager, Washington, D. C. office.

Thursday, June 6:

"Defects of Rayon Yarn and Fabric"—Karl M. Currier, assistant manager, Textile Research Department.

"Testing For Quality"—LeRoy S. Converse, manager, Standards Department.

Friday, June 7:

"Chemical Research by AVC"—F. W. Koster, assistant director, Chemical Research Department.

"Rayon Fibers—Inside and Out"—Dr. Wayne A. Sisson, Chemical Research Department.

Saturday, June 8:

"Industrial Uses For Rayon"—H. E. Shearer, Textile Research Department.

"Future Fabrics"—Rene Bouvet, Textile Research Department.

"Rayon Markets Today and Tomorrow"—H. Wickliffe Rose, coordinator of research and development.

Those attending the seminar were:

From *Bradford Durfee Textile School:* Alfred Higgins, Walter E. Marston, John W. Norman, Harold C. Smith and William H. Wingate.

From *Clemson Agricultural College:* Hugh M. Brown, dean, T. A. Campbell, E. F. Cartee, Joseph Lindsay, Jr., A. E. McKenna, D. P. Thomson, J. V. Walters, and W. B. Williams.

From *Lowell Textile Institute:* Harry C. Brown, Russell L. Brown, Kenneth R. Fox, Dean, John A. Goodwin, Charles L. Howarth, Nathaniel E. Jones, John L. Merrill, Henry L. Pero, John H. Skinkle and Victoria Rosatto.

From *New Bedford Textile School:* Thomas H. Gourley and Francis Tripp.

From *North Carolina State College:* J. F. Bogdan, Malcolm E. Campbell, dean, J. T. Hilton, Dr. E. T. Peirce and W. E. Shinn.

From *Philadelphia Textile Institute:* Richard S. Cox, dean, A. Ward France, Frank L. Giese, Constantin Monego, John Naab and Robert Stafford.

From *Rhode Island School of Design:* William S. Huber and Alexander M. Simoneau.

From *Texas Technological College:* Dr. H. M. Hefley, Theron Lehr, and Frank Kelley.

• PLASTICS GUILD CORP.

Announcement is made of the entry of Plastics Guild Corporation into the transparent film printing and processing business. Their research department has developed a new process which softens the film while under tension embodying the color print within. With such a method the colors are said to become an integral part of the film making for greater durability of the printing colors. To insure their customers this quality product the selvage will carry the impression "Processed by Plastics Guild Electro Set Method."

A new plant has been opened at 85 Fifth Avenue, Paterson, New Jersey, to handle this part of their work. They coat, laminate, emboss and polish plastics, films, pliofilms, Cellophane, acetate and synthetics.

Keith A. Bragg who has been engaged as a southern representative with headquarters in Charlotte, N. C., by the Commonwealth Color & Chemical Co. of Brooklyn, N. Y. Mr. Bragg has been brought up in the textile trade and was associated with his father for a number of years in the Middle West in the dyeing and finishing business, especially hosiery. He served during the war in the navy, was on active duty in the Pacific and has recently been discharged.

At a recent Directors meeting the following Officers were elected:

Oliver Oakley Brant, President. Mr. Brant is also in the chemical business.

John H. Friden, Vice President. Mr. Friden is Vice President of the Sun Tube Corporation, Decorated Container Company and part owner of the Newark Engineering Company.

Bernard H. Pelka, Secretary and General Manager. Mr. Pelka was formerly with Standard Cap and Seal and has many years in film print and coating experience.

George W. Johnson, Treasurer. Mr. Johnson is a Partner in the John A. Johnson Contracting Corporation.

The New York office is at 50 Church Street.

• MONSANTO APPOINTMENT

Appointment of Edwin L. Hobson to the sales staff of Monsanto Chemical Company's Plastic Division has been announced by F. A. Abbiati, general manager of sales.

Recently discharged as lieutenant colonel of the Quartermaster General Office, Hobson served through the war years as plastics section chief of the Military Planning Division's Research and Development Branch.

From 1937 to 1941, Mr. Hobson was a sales engineer for the Bakelite Corporation of New York City. He received his chemical engineering degree from the Massachusetts Institute of Technology in 1937.

Mr. Hobson will spend several months at the Springfield plant and will then be assigned to one of the division's branch offices.

• MERCERIZATION BOOKLET BY DEXTER

"Methods for the study and control of mercerization," the third in a series of reprints by Sidney M. Edelstein, Technical Director of the Textile Chemical Division of the Dexter Chemical Corporation, has been released for distribution. In this booklet Mr. Edelstein, a well-known authority on the mercerization process, explains in detail how a manufacturer can conduct his own experiments in mercerization embracing such phases of the process as the determination of tension, direct dye affinity, barium activity numbers, and luster. Copies are available by writing to the Dexter Chemical Corporation, 819 Edgewater Road, New York 59, N. Y.

• GERMAN CELLULOSE ETHER

A cellulose ether developed by the Germans for use as a washing agent by the textile industry is described in a report released by the Office of the Publication Board, Department of Commerce (PB-14527; photostat, $2; microfilm, 50 cents; 19 pages). The ether was known by the trade name "Tylose HBR."

The report (dated January 10, 1946) was made by David Traill and Stanley Brown for the Joint Intelligence Objectives Agency.

The merit of the cellulose ether was that it prevented colloidal dirt from resettling on fabric after it had been removed by soaps. Use the ether permitted a 50 percent reduction in soap usage, according to the report.

The ether was also used for sizing rayon, for waterproofing fabrics, and for thickening cotton printing solutions. A purified form of "Tylose" was used as an emulsifying agent and thickener in cosmetics, food stuffs, and ice cream.

The manufacturing process and composition of "Tylose" and other cellulose ethers are described in the report.

Production of cellulose esters, such as cellulose acetobutyrate, cellulose tripropionate, and cellulose triacetate, also is discussed in the report. Cellulose acetobutyrate was used in the preparation of X-ray films because of its low moisture content.

Orders for the report should be addressed to the Office of the Publication Board, Department of Commerce, Washington 25, D. C., and should be accompanied by check or money order, payable to the Treasurer of the United States.

● GERMAN FINISHING AGENT

A water repellant, crease resistant finish for spun rayon, developed experimentally by the I. G. Farbenindustrie, is described in a report released by the Office of the Publication Board, Department of Commerce (PB-14525; photostat, $1; microfilm, 50 cents; 4 pages). Samples of the finished fabric showed low residual shrinkage in pilot plant experiments.

The report, made by Glenn D. Jackson, Jr., for the Joint Intelligence Objectives Agency, is based on an examination of samples and an interview with the director of the I. G. Farben laboratory at Hoechst.

A novel feature of the finish was that it could be applied by a one-bath method, according to the report. The water repellant and anti-creasing materials could be mixed because both were resins. The compositions of the resins and the method of application are described in the report.

Samples of the finished fabric examined by the investigator had a full, heavy, suedy hand, with excellent anti-crease properties, and appeared effective for water repellancy. The finish was also said to be dust resistant and durable.

Orders for the report should be addressed to the Office of the Publication Board, Department of Commerce, Washington 25, D. C., and should be accompanied by check or money order, payable to the Treasurer of the United States.

● STEAM CLEANING DETERGENT

A new heavy-duty alkaline-type detergent specially designed to use in modern steam guns and coil-type steam generating mechanisms has been announced by Oakite Products, Inc.

The new high-speed detergent, called Oakite Composition No. 92, has been pretested during the past year. Decisive reductions in time and cost allocations for such jobs as the following are said to have been recorded: Cleaning machinery and equipment parts for subsequent repair and overhaul, preparing equipment surfaces for repainting or refinishing, cleaning equipment too large for tank immersion or where suitable tanks are not available, paint stripping and other cleaning operations.

Free Service Report describing this new material may be secured by writing on company letterhead to Oakite Products, Inc., 54A Thames St., New York 6, N. Y.

● BURRELL & NEIDIG

Harry Burrell, and C. P. Neidig have announced the formation of Burrell & Neidig, an industrial chemical consulting firm with offices at 115 Broadway, New York City.

Mr. Burrell was formerly Director of Research of the Heyden Chemical Corporation, Garfield, N. J. laboratories and Mr. Neidig was in charge of the Market Research and Technical Service Group for the Heyden Chemical Corporation.

Burrell & Neidig plan to consult on formaldehyde and its uses, plastics and their raw materials, protective coatings, sales development work on new products, research administration and market surveys for the chemical and allied fields.

● JOINS N. Y. & N. J. LUBRICANT

James E. McNeely, Jr., a veteran of three years' service in the Army Air Forces, has joined the sales and engineering department of New York and New Jersey Lubricant Company, as the firm's representative with headquarters at Gastonia, N. C. Mr. McNeely is an alumnus of the North Carolina State College school of textiles and prior to entering the service was connected with Erwin Cotton Mills at Cooleemee, N. C.

● COATERS' INSTITUTE MOVES

Major C. Stewart Comeaux, Executive Secretary-Treasurer, announced the headquarters of the Pyroxylin and Resin Coaters' Institute has moved from 103 Park Avenue to 343 Lexington Avenue, New York 16, N. Y.

● AWARD TO VICSOSE MEN

Rear Admiral G. F. Hussey, Jr., U.S.N., chief of the Bureau of Ordnance, has presented the Naval Ordnance Development Award to Rene Bouvet, William G. Luttge and Walter E. Scholer of American Viscose Corporation. The award was given in recognition of "exceptional service to the research and development of naval ordnance," the specific project involved being the development of rayon fabric with adequate properties for the design and construction of mine-laying parachutes.

Mr. Bouvet is in charge of textile development at the company's Textile Research Department at Marcus Hook, Pa. Mr. Luttge is manager of the viscose rayon yarn sales division of the New York office and during the war, in addition to his other duties, headed the War Effort Department which cooperated with Army and Navy agencies in the development of rayon textile items for war uses. Mr. Scholer is assistant manager of the company's Fabric Development Department and during the war was assigned to the War Effort Department.

The award is in the form of a certificate, which expresses appreciation for exceptional service to naval ordnance development, and a lapel emblem. These are awarded, Rear Admiral Hussey states, as a "symbol of appreciation from the Bureau of Ordnance and from the entire Navy for the outstanding ability and untiring efforts" which the recipients consistently displayed during the war.

Lapel emblems, in recognition of contributory effort to the success of the mine-laying parachute fabric development project, were simultaneously presented to William W. Bowman and James Gorman of American Viscose Corporation's Textile Research Department, and to Frank T. Williams of the viscose rayon yarn sales division at the New York office.

● WORLD CHEMICAL CORP.

World Chemical Corporation, manufacturers of chemical specialties, have opened their new plant located in Queens, New York, for the manufacture of synthetic organic detergents for the textile, leather, soap and industrial cleaner field.

The Corporation maintains offices at 1819 Broadway, New York, New York.

Officers are Mortimer A. Fischer, President, and Arthur A. Lehman, Sec'y.-Treas. Mr. Lehman, who is the President of Leecol Products, Inc., who are manufacturers of chemical specialties, has been associated with the chemical field for 30 years.

● FURFURAL BULLETINS

Two more bulletins in the series on Furfural and its derivatives being published by The Quaker Oats Company Chemicals Dept. are now off the press and available to those interested in this chemical family. Bulletin 202 "Introduction to Chemistry of the Furans" is a sixteen page booklet which covers in detail the structural formulae, nomenclature, chemical properties and formation of the Furan compounds. It also describes methods of detection and analysis and contains charts showing principal reactions of Furfural.

Bulletin 203 "Physical Data on Furfural" is a sixteen page booklet containing thirteen tables and graphs covering such data as composition and density tables, vaper pressure curve, solution temperatures, solubility of organic acids, salts, Furfural gums and resins in Furfural.

These bulletins should be of particular interest to the research worker and copies are obtainable from The Quaker Oats Company Chemicals Dept., Board of Trade Bldg., Chicago, Illinois.

● USE OF FISH PROTEIN

German textile researchers claim that viscose rayon fibers become warmer and more wear resistant and have the same reaction to dyes as wool when fish protein is added to the cellulose compound, according to a report released by the Office of the Publication Board, Department of Commerce (PB-7912, photostat, $1; microfilm, 50 cents; 5 pages).

The report was made by P. Larose and A. C. Burton for the British Intelligence Objectives Sub-Committee.

Viscose fibers made with 25 percent fish protein will take a crimp, like wool, which

results in a warmer fabric. The fiber can also be dyed with wool dyes, according to the investigators. Attempts to make a 100 percent fish protein fiber were found to be impractical because the resulting fiber lacked tensile strength.

The only German packing plant for fish protein, at Hamburg, and its equipment and methods are reviewed in detail by the investigators.

The results of an interview by the same investigators with one of the leading German chemists, Professor O. Mecheels, at Hohenstein Schloss bei Bonnigheim, are presented in another report (PB-7913; photostat, $1; microfilm, 50 cents; 5 pages). Dr. Mecheels, who developed a "foam suit" for the thermal protection of aviators falling at sea, described his work on thermal testing and his methods for measuring the thermal insulation of fabrics.

The report also contains brief descriptions of conditioning apparatus, abrasion testing machinery, X-ray, and other textile research equipment used by Dr. Mecheels and his staff.

Orders for the reports should be addressed to the Office of the Publication Board, Department of Commerce, Washington 25, D. C., and should be accompanied by check or money order, payable to the Treasurer of the United States.

● MAXITOL No. 10

Maxitol No. 10 is a new protective agent and dyeing oil for wool recently developed by the Textile Chemical Division of the Dexter Chemical Corp. of New York City. It is claimed that this highly sulfated oil not only promotes level dyeing of wool and assists in penetration, but also protects the fiber in dyeing, bleaching, drying, and after use. It tends to facilitate the production of highest quality goods.

Unlike many other textile assistants, Maxitol No. 10 is a homogeneous chemical body. Because of its peculiar chemical character, Maxitol No. 10 differs from ordinary sulfated products in being able to form a stable compound with the basic groups of wool. The fibers are therefore covered with a thin film of oil which cannot be rinsed off due to the fact that it is bound chemically to the wool substance.

It is stated that wool that has been dyed with the addition of Maxitol No. 10 will not be nearly as susceptible to injury from high drying temperatures as ordinary wool. This is said to be due to the fact that Maxitol No. 10 treated wool will always contain more moisture than goods that have been treated in the usual way. Because of the wetting and penetrating qualities of the Maxitol No. 10, this effect is distributed uniformly over the whole surface of the goods so that any risk even of partially drying out is said to be effectually eliminated.

Division of Cellulose Chemistry of the AMERICAN CHEMICAL SOCIETY

Abstracts of Some of the Papers Presented at Atlantic City, N. J., April 8 to 12, 1946

THE CRYSTALLINITY OF CELLULOSE FIBERS

Howard J. Philipp, Mary L. Nelson, and Hilda M. Ziifle

A simple experimental method for the determination of the relative proportions of crystalline and amorphous cellulose in cellulose fibers has been developed. The method involves the determination of the rate of heterogeneous hydrolysis of cellulose with hydrochloric acid by measuring the weight of the hydrolysis residues as a function of time. A correction for the insoluble humic substances formed from glucose under the conditions of cellulose hydrolysis is described.

The heterogeneous hydrolysis of cellulose was found to be a superposition of two monomolecular reactions, a fast one responsible for the hydrolysis of the loose amorphous regions, and a slow one reflecting the hydrolysis of the dense crystalline areas of the cellulose. After all the amorphous cellulose is hydrolyzed, a plot of the logarithm of the corrected residues against time becomes a straight line which permits determination of the percentage of crystalline cellulose in the sample by linear extrapolation to zero time. The values thus obtained are independent of the temperature and acid concentration employed.

Results of the application of the new method to a series of natural and regenerated cellulose fibers, such as cotton linters, raw and mercerized cotton, ramie, and various rayons are reported. Results on four rayon samples are well correlated with crystallinity data derived from x-ray diffraction patterns. There is apparently no correlation between the degree of crystallinity and the tenacity of five samples of rayon. In the case of six cotton samples there did not appear to be any relation between degree of crystallinity and crystallite orientation. There are indications that the ultimate elongation and the moisture absorption of the rayon samples are proportional to their content of amorphous cellulose.

THE DEGRADATION OF RAYON TIRE YARN AT ELEVATED TEMPERATURES

R. C. Waller, K. C. Bass, and W. E. Roseveare, Viscose Rayon Research, E. I. du Pont de Nemours & Co., Richmond, Va.

The chemical and physical changes resulting from heating a regenerated-cellulose tire yarn under a variety of laboratory conditions have been studied. Either oxygen or moisture alone accelerates the degradation of the yarn and when present together the rate is greatly increased, this increase being greater than one would predict from a consideration of the effects produced when they are present separately. The oxycellulose formed when oxygen is present is decomposed to give by-products which further accelerate the deterioration. Both aldehyde and carboxyl groups are present in this material.

Heat-aging affects various physical properties of the yarns. The moisture adsorption capacity is reduced by about 40 per cent. The x-ray diffraction pattern becomes sharper and a partial conversion from a regenerated to a native-cellulose structure takes place. Solution viscosity determinations measure the change in the degree of polymerization.

The strength of rayon tire yarn is decreased after exposure to elevated temperatures, the amount of loss being dependent upon the time, temperature, moisture, and oxygen content. The fatigue life is even more affected. The rating of nylon and cotton cords relative to rayon depends on the amount of moisture and oxygen present during the test.

These facts are correlated into a theory of the mechanism of the degradation of cellulose at elevated temperatures.

ELEMENTARY COMPOSITION OF WOOD LIGNIN IN SITU, AS ISOLATED KLASON AND PERIODATE LIGNINS

W. J. Wald, P. F. Ritchie, and C. B. Purves.

It is well known that holocellulose and Klason lignin together account for very

nearly 100 per cent by weight of solvent-extracted woods. It is therefore possible, as Fuchs pointed out in 1926, to calculate the carbon, hydrogen, and methoxyl contents of the lignin *in situ* from those of the wood and holocellulose. Application of this calculation to northern pine and black spruce woods gave C, 68 to 69 per cent for the carbon content of the lignin as it existed in the wood. Comparison with the values of 61 to 67 per cent found for the corresponding Klason lignins suggested that the latter had undergone definite chemical change during isolation. Although the weight recovery of the woods as holocellulose and lignin was practically quantitative, the carbon recovery was definitely low.

The holocellulose was removed by alternately oxidizing the wood meals with sodium periodate, at pH 4 and 20°C., and extracting the oxidized products with hot water at pH 7. This process minimized any chemical change induced in the lignin by methods of isolation involving mineral acids and alkalies. The resulting periodate lignin, which represented 80 per cent of the original Klason lignin in a state of 88 to 92 per cent purity, contained no hemicellulose or pentosan. The yield of 80 per cent, together with a comparatively low carbon content of 60 to 62 per cent, suggested that some portion of the lignin entity had been lost by oxidation during isolation.

THE STABILITY OF THE METHOXYL GROUPS IN METHYLATED HYDROCHLORIC ACID SPRUCE LIGNIN

F. E. Brauns, The Institute of Paper Chemistry, Appleton, Wis.

In an earlier investigation of the decomposition of methylated sprucewood with various reagents, it was found that lignin derivatives were always obtained with a lower methoxyl content than was expected. Because it seemed to be indicated that methoxyl groups are split off from the lignin, their stability in methylated hydrochloric acid spruce lignin was studied. When the methylated lignin (MeO content 32.2 per cent) is subjected to a Klason lignin determination, 2 methoxyl groups are split off, giving Klason lignin with 26.9 per cent methoxyl. When the methylated lignin is refluxed with acetic acid in the presence of magnesium chloride, 2 methoxyl groups are again split off, giving a partially methylated acetic acid hydrochloric acid lignin containing 26.2 per cent methoxyl and 4.[illegible] per cent acetyl, corresponding to 8 methoxyl groups and 1 acetyl group. Treatment of the methylated lignin with phenol and 0.5 per cent hydrochloric acid at 95° gives a phenol methylated hydrochloric acid lignin with 3 phenol groups and 21.4 per cent methoxyl, indicating that 2 methoxyl groups have been split off. When hydrochloric acid spruce lignin is heated with thiophenol in the presence of 1 per cent hydrochloric acid, it goes completely into solution with formation of a thiophenol hydrochloric acid lignin containing 3 thiophenol groups and all of its original methoxyl groups. The methylated lignin, under the same conditions, also condenses with 3 thiophenol groups, but loses 2 methoxyl groups. With thioglycolic acid, the methylated lignin gives an insoluble thioglycolic acid methylated hydrochloric acid lignin containing 3 thioglycolic acid groups, losing 1 methoxyl group in this reaction and another on treatment with 72 per cent sulfuric acid. When heated with 5 per cent sodium hydroxide at 175-80°, the methylated lignin is not changed.

• CLASSIFIED ADVERTISEMENTS •

CONFIDENTIAL EMPLOYMENT SERVICE — We invite correspondence (confidential) with Dyers, Chemists, Colorists, Superintendents, Master Mechanics, Office Managers, and others seeking positions and with employers seeking high-grade men to fill vacancies or to make replacements. Charles P. Raymond Service, Inc., 294 Washington St., Boston, Mass. Over 45 years in business.

POSITION WANTED: Experienced dyer on cotton, rayon, acetate piece goods. Some bleaching and finishing experience. Box 867.

POSITION WANTED: Assistant dyer or textile colorist; 13 years mill and laboratory experience in wool and rayon top and raw stock dye plant. 34 years old, married and have 2 children. Prefer southern New England. Write Box 872.

POSITION WANTED: Experienced in analyses of fabrics particularly resin and rubber-coated materials. Physical tests, accelerated ageing. Fade-Ometer, Weather-Ometer, etc. Immediately available for employment in Metropolitan area. Write Box 875.

WANTED: Experienced dyer to take complete charge of dye house. Must be familiar with dyeing of all fibres. Large producer of men's seamless half hose. Located in South. In replying, state full qualifications. Write Box 879.

POSITION WANTED: Research-development engineer. Sixteen years in responsible positions. Extensive experience in synthetic resins and plastics, applications as well as manufacture; textile finishes; synthetic fibers; soaps, oils, waxes; adhesives; emulsions. Broad education. Creative, operative. Atlantic seaboard preferred. Box 882.

WANTED: Dye Chemist preferably with experience in research and development. Medium size Dye Plant. Excellent chances for future. State qualifications. Box 883.

POSITION WANTED: Superintendent of dyeing. Eighteen years' experience. Employed at present. Age, 38, married. Box 884.

WANTED: Young man for position of technical supervisor of dyeing and finishing. Must have had practical experience. Excellent opportunity with nationally known organization. Box 885.

POSITION WANTED: Graduate chemist, half-way to masters, four years textile chemicals, mainly wetting agents. Employed at present, wants to connect with reliable company, northern New Jersey, metropolitan New York. Married. Box 886.

The rate for "Position Wanted" advertisements in this column is 2 cents a word—with a minimum of 50 cents per insertion. For all other types of advertisements—i.e., help wanted, machinery or supplies for sale—the rate is $6.25 per column inch or less per insertion.

CALCO ACETATE DIAZO BLACK GSH DUSTLESS

Calco Acetate Diazo Black GSH is a non-subliming green-black shade, having excellent penetrating and leveling properties. It dyes well at low temperatures and disperses readily under practically all dyehouse conditions.

The excellent general fastness properties of Calco Acetate Diazo Black GSH make it desirable as an all-purpose product. It is especially recommended for jig and beck dyeing of all qualities of acetate and acetate-mixed fabrics.

Write to Calco for further information on Calco Acetate Diazo Black GSH.

Calco

CALCO CHEMICAL DIVISION
AMERICAN CYANAMID COMPANY
Bound Brook, New Jersey

New York · Chicago · Philadelphia · Boston · Charlotte · Providence

DYESTUFFS

•

SPECIALTIES

BICK & CO., Inc.
Manufacturing Chemists
Reading, Pa. Charlotte, N. C.

RAPIDASE

for de-sizing cottons, rayons and mixed goods

•

Assures rapid, dependable de-sizing.

•

Our technical staff always at your service.

•

WALLERSTEIN COMPANY, INC.
180 MADISON AVENUE • NEW YORK 16

QUALITY **RICHMOND** PRODUCTS

Less Handling with

AFTER CHLOR

Eliminates 3 to 5 Handlings

Bleach with
Hypochlorite
Rinse and Use

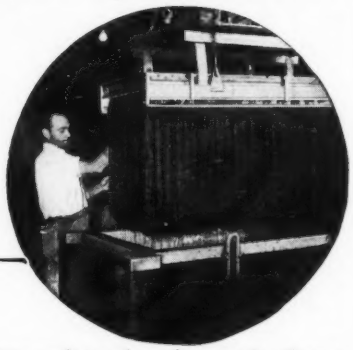
AFTER CHLOR

THAT'S ALL!

Write for FREE Sample

RICHMOND OIL, SOAP & CHEMICAL CO., Inc.
1041-43 FRANKFORD AVE., PHILADELPHIA 25 PA.

Clearer, more even dyeing, *faster* with *Laurel* WOOL SCOURING COMPOUNDS



YOU are sure of clean, soft wools and worsteds, clearer, more even dyeings when you use Laurel Scouring Compounds. Known for their speedy detergent action and used by leading mills for over thirty-five years, Laurel Scouring Compounds remove grease, oil, dirt quickly, economically, without injury to fibers. Keep mineral oils in suspension. Leave wool lofty and with soft hand . . . level dyeing. Available now. Send for trial order today Let Laurel Scouring Compounds help you improve quality production and deliveries.

LAUREL WOOL OILS • LAUREL FULLING COMPOUNDS

• SOAPS • OILS • FINISHES •

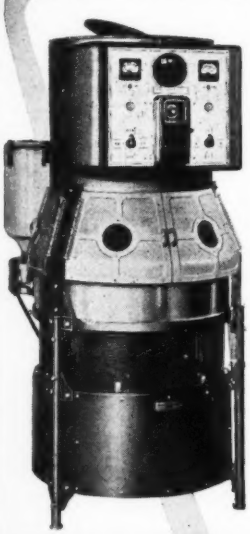
LAUREL SOAP MANUFACTURING CO., Inc.

Wm. H. Bertolet's Sons • *Established 1909*

WAREHOUSES—PATERSON, N. J. • CHATTANOOGA, TENN. • CHARLOTTE, N. C.

OFFICES—2601 East Tioga Street, Philadelphia 34, Pa.

FADE-OMETER



• For over twenty-five years the yardstick of the Textile and Dyestuff industry for determining the light fastness of materials.

An indispensible machine for proving the light fastness of dyestuff and fabrics. Fade-Ometer tests are required by many government specifications.

Specimens are rotated around the Atlas Enclosed Violet Arc—the closest approach to natural sunlight. Temperature and humidity regulated—fully automatic in operation—perfectly safe to operate unattended over night.

ATLAS ELECTRIC DEVICES CO., 361 W. Superior St., Chicago 10, Ill.

ATLAS-OMETERS

Weather-Ometer ★ Fade-Ometer ★ Launder-Ometer

trouble free Nylon Knitting with NYASIL

Nyasil used in the trough, makes nylon yarn more pliable. Needles and sinkerheads do not become clogged or sticky, breakage is prevented and production is uninterrupted. Nyasil causes no trouble in the dye bath since it contains no contaminating impurities. Nyasil is a pre-war *proved* product—proved by performance in the total production of nylon hosiery in many of the nation's leading mills. Nyasil is economical since a pint is sufficient in 30 gallons of water.

ORDER TODAY

5, 10, 15, 30 and 55 gallon containers

Specialties for
SCOURING
STRIPPING
PENETRATING
FINISHING

Zurnoil TEXTILE CHEMICALS

Oils for all textile conditioning requirements

O. F. ZURN COMPANY

PHILADELPHIA 32, PA.

KNOXVILLE, TENN. • HAMILTON, ONT., CANADA

for that SCOURING PUNCH

ATCOSYN

The New Synthetic Powdered Organic Detergent

Ideal for scouring or boiling off all types of fabrics applicable in continuous machines, jigs, boxes and all types of skein and package machines.

Excellent as a dyeing assistant or as a dispersing agent for all classes of dyestuffs. Superior dispersing agent for vat colors, both in box work and vat pad dyeing. Promotes level dyeing, even shades.

Used for washing off after printing, ATCOSYN means brighter shades, crocking reduced to a minimum. Can be used as a soap assistant, eliminating any precipitates and resulting in easy rinsing.

Remember ATCOSYN gives you THAT SCOURING PUNCH!

Ask for complete technical data and product sample!

Use ATCO Products

Atlantic Chemical Co.

MAIN PLANT : CENTREDALE, RHODE ISLAND

BRANCH OFFICE : PATERSON, NEW JERSEY

for manufacturers and jobbers

synthetic detergents

textile specialties

Michel Export Co. inc.

90 Broad Street ***New York 4, N. Y***

For quotations write Domestic Sales Dept.

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FOR

LEATHER · WOOL · SILK

COTTON · FUR · HAIR

PIGMENTS

DEPENDABLE SOURCE OF SUPPLY

ECONOMICAL - RELIABLE

TANNIC ACID SUMAC QUERCITRON

FUSTIC GAMBIER FLAVINE

YOUNG EXTRACTS--SERVING THE INDUSTRY SINCE 1869

THE J. S. YOUNG COMPANY

2701 BOSTON STREET

BALTIMORE 24, MARYLAND

COMMONWEALTH
COLOR & CHEMICAL CO.

More than thirty years' experience in the manufacture of Chemical Specialties, Dyestuffs and Dyewoods for the Textile and Allied Trades . . .

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PHILADELPHIA • CHICAGO • GLOVERSVILLE • MONTREAL

For Rewetting In
SANFORIZING
AQUAKAL 74

is quick and effective

•

Also a fast wetting agent and penetrant for dyeing packages, piece goods, skeins and raw stock.

•

Or wherever fast, even wetting and penetration are necessary.

Kali

MANUFACTURING CO.
Manufacturing Chemists
427 MOYER ST. PHILADELPHIA, PA.

QUALITY **RICHMOND** PRODUCTS

Something Really NEW for WOOL and WORSTED

Scours either neutral or acid
Contains NO Soap
Does not break in hard water

•

SCOURCLEAN X

The newest idea for
WOOL and WORSTED

•

Send for FREE Sample

RICHMOND OIL, SOAP & CHEMICAL CO., Inc.
1011-43 FRANKFORD AVE. PHILADELPHIA 25 PA

Insure your textiles

Against loss from Mildew and Bacterial Destruction

REG. U. S. PAT. OFF.

Effective and Economical GERMICIDAL and FUNGICIDAL FORMULAS

The PURATIZED* formulas perfected for the treating of military fabrics to protect them against attack by mildew and bacteria are finding ever increasing uses for *consumer textiles.*

The PURATIZED formulas proven by years of use protect textiles during the process of manufacture and impart to the finished material resistance to attack by destroying bacteria and fungi. *Consumer textiles* treated with the PURATIZED formulas have added *serviceability, durability* and *merchandiseability.*

Investigate our safe and economical method of fabric treatment at once. The many advantageous factors will help build tremendous acceptance for fabrics bearing your mark. And remember:

Puratized offers *all* these advantages

1. Fungicidal, germicidal and antiseptic finish.
2. Most economical and easy to use—only one bath treatment necessary.
3. Leaves no objectionable odors.
4. Compatible with all other finishes.
5. Does not impart toxic or irritating properties to fabric when used according to recommended application procedure.
6. Does not alter color, feel or hand nor affect porosity.
7. Does not alter tensile strength, disturb quality or physical properties.
8. Formulas are available for your individual needs—water phase, oil phase and alkali soluble cellulose finish.

WRITE TODAY *for additional information pertaining to your individual problem. Samples are available upon request.*

Manufactured by

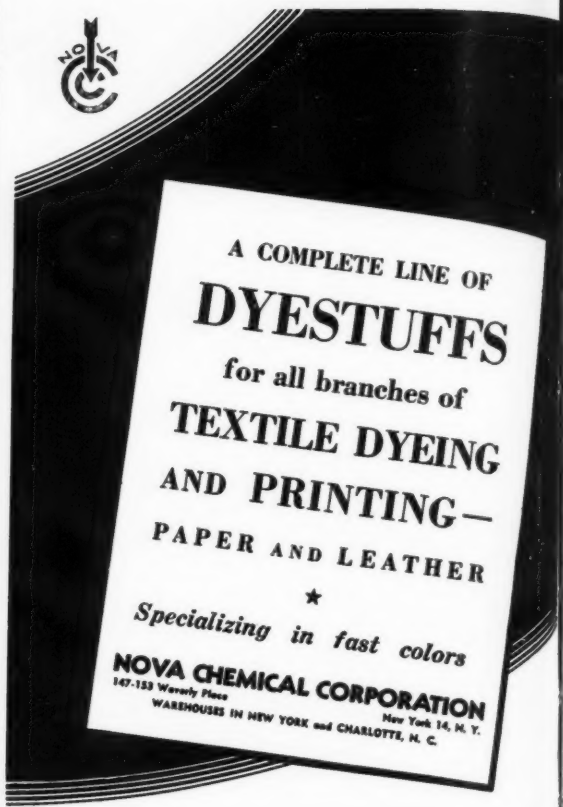
GALLOWHUR CHEMICAL CORPORATION

Sales Agents

GENERAL DYESTUFF CORPORATION

NEW YORK CITY

*T. M. Reg. U. S. Pat. Off.



SALES REPRESENTATION

Established chemical manufacturing organization requires the immediate services of sales representatives who have well-established contacts in the textile industry.

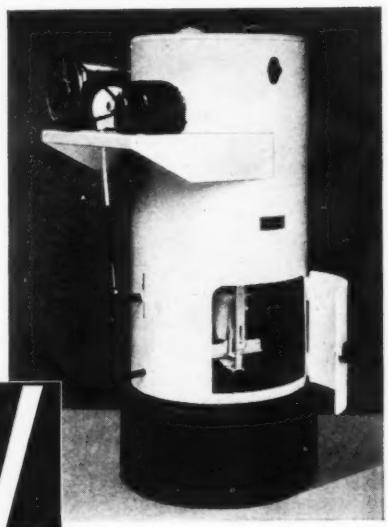
Our organization is producing large quantities of basic materials, and the men we select will not be hampered by today's scarcity of fats and oils.

You have our assurance that all correspondence will be treated in strict confidence.

Box No. 881

Now

YOU CAN SAVE
"HYDRO" AND
$ $ $ $
WITH THE
"HYDROMISER"



V
VIRGINIA

Progressive finishers who are using this new VIRGINIA "extra" report a 10 to 15 percent Hydro saving and a significant reduction of rejects in continuous dye operation. The HYDROMISER automatically feeds Sodium Hydrosulphite to the dye bath, insuring uniformity through accurately controlled flow—1 pound to 200 pounds per hour. If your dye process is continuous, you should investigate. Mail the coupon for complete details on the HYDROMISER.

VIRGINIA
SMELTING COMPANY
WEST NORFOLK, VIRGINIA
NEW YORK • PHILADELPHIA • BOSTON
CHARLOTTE • DETROIT

Virginia Smelting Co.,
West Norfolk, Va.

Gentlemen:

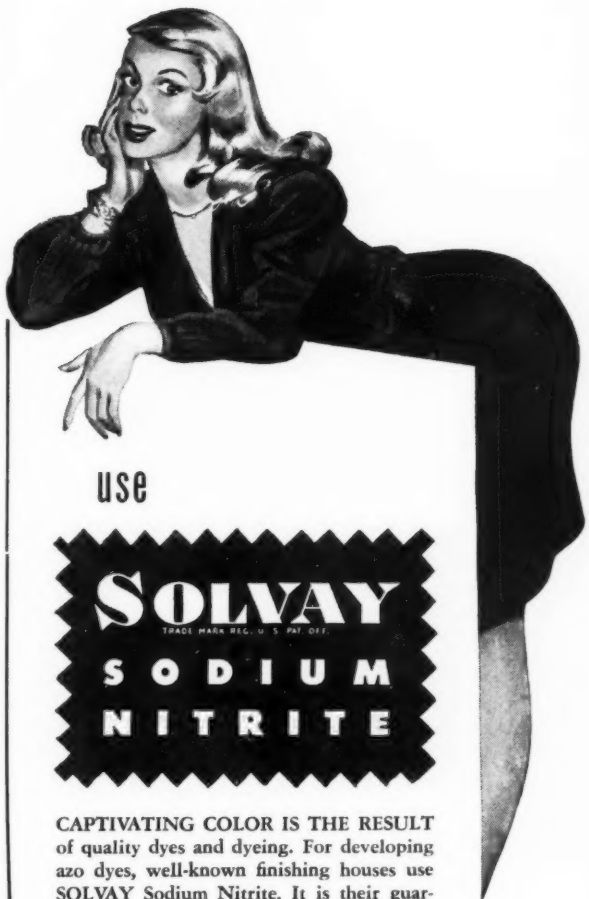
Please send information on saving Sodium Hydrosulfite with the HYDROMISER.

Name_____ Position_____

Company_____

City_____ Zone_____ State_____

when beauty
calls for science



use

SOLVAY
TRADE MARK REG. U. S. PAT. OFF.
SODIUM
NITRITE

CAPTIVATING COLOR IS THE RESULT of quality dyes and dyeing. For developing azo dyes, well-known finishing houses use SOLVAY Sodium Nitrite. It is their guarantee of a *quality* result . . . a *better* result for cotton, rayon, silk . . . color fastness at minimum cost.

A QUICK LOOK AT SOLVAY Sodium Nitrite shows you why it is superior. This U.S.P. Grade is a fine powder whose crystals tend to remain unusually free-flowing. Shipped in convenient-to-handle 425-pound barrels. Specify quality . . . specify SOLVAY.

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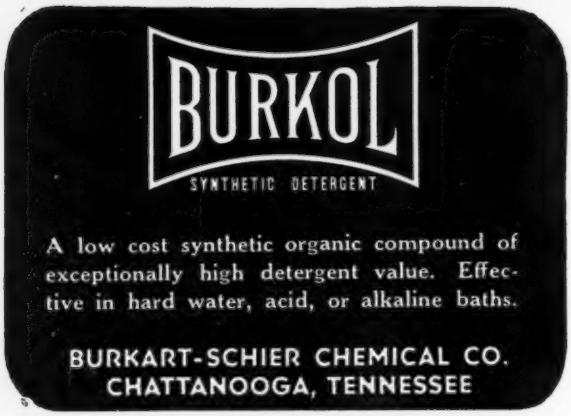
Alkalies and Chemical Products Manufactured by The Solvay Process Company
40 Rector Street **New York 6, N. Y.**

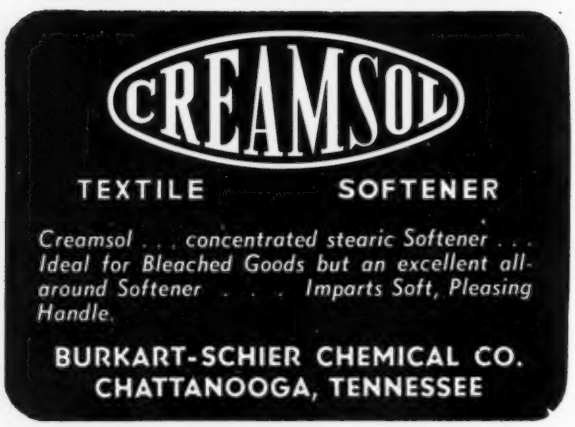
BRANCH SALES OFFICES:
Boston • Charlotte • Chicago • Cincinnati • Cleveland
Detroit • Houston • New Orleans • New York
Philadelphia • Pittsburgh • St. Louis • Syracuse

Specify Quality
. . . Specify SOLVAY

SOLVAY

AROMINE
DYE-BATH ASSISTANT
Wetting Agent . . . Dyeing Assistant . . . Water Normalizer . . . Produces Brighter Shades . . . For All Fabrics.
Effective in hard water, acid or alkaline baths.
BURKART-SCHIER CHEMICAL CO.
CHATTANOOGA, TENNESSEE


BURKOL
SYNTHETIC DETERGENT
A low cost synthetic organic compound of exceptionally high detergent value. Effective in hard water, acid, or alkaline baths.
BURKART-SCHIER CHEMICAL CO.
CHATTANOOGA, TENNESSEE


CREAMSOL
TEXTILE SOFTENER
Creamsol . . . concentrated stearic Softener . . . Ideal for Bleached Goods but an excellent all-around Softener . . . Imparts Soft, Pleasing Handle.
BURKART-SCHIER CHEMICAL CO.
CHATTANOOGA, TENNESSEE

SCOURING WETTING
PINE-SOLVENT
BLEACHING DYEING
Wets . . . Penetrates . . . Suspends . . . Disperses . . . Aids Detergents and Dyes . . . Cuts Time and Cost.
BURKART-SCHIER CHEMICAL CO.
CHATTANOOGA, TENNESSEE

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Its 2-Way Action
Brings 20-Way Benefit To Your Goods
NOPCO FUA REVOLUTIONARY *Self-Fulling Self-Scouring* WOOL OIL!

BENEFIT 1.
100% FATTY—CONTAINS NO MINERAL OIL

Benefit 2. **Nopco FUA is non-oxidizable.**

BENEFIT 3. SPEEDS UP CARDING

Benefit 4. **Nopco FUA won't gum up the cards. There is considerably less "loading up" on the clothing, which results in an appreciable saving in stripping time.** ***Benefit 5.*** **It has anti-static properties that cut down fly in carding and produce a rounder, loftier roving. Being a fatty product, Nopco FUA penetrates and nourishes the leather rub rolls and condenser tapes, leaving them soft and preserving the natural life and cushion of the leather.**

BENEFIT 6. IMPROVES YARN PRODUCTION.

Benefit 7. **With Nopco FUA, the original loft and resiliency of wool fibers is maintained.** ***Benefit 8.*** **It prevents "bearding," a common cause of fiber weakening.** ***Benefit 9.*** **It helps increase yarn's tensile strength.** ***Benefit 10.*** **It will not become set in the yarns during steaming nor in the goods after steaming and crabbing.**

BENEFIT 11. FULLS AND SCOURS WITHOUT SOAPS OR DETERGENTS

Benefit 12. **Nopco FUA acts like an oil on the fibers and like a soap in the wet finishing operation.**

Benefit 13. **The 3% Nopco FUA and water solution *originally* added to the stock gives "hard-to-believe" fulling and scouring results, *without the addition of soap or detergents.*** **Some mills have found even lower percentages of Nopco FUA highly effective.** ***Benefit 14.*** **Nopco FUA leaves the stuffing box and folds in the same manner as when soap or detergents are used.** ***Benefit 15.*** **It makes for appreciable saving in rinsing time.**

OTHER ADVANTAGES OF THIS NOVEL TEXTILE LUBRICANT

Benefit 16. **Nopco FUA is more compatible with fugitive tints than any similar product.** ***Benefit 17.*** **Nopco FUA aids level piece dyeing.** ***Benefit 18.*** **It eliminates need of excessive alkali.** ***Benefit 19.*** **It gives extremely low ether extraction.** ***Benefit 20.*** **It helps remove pitch or tar easily. Nopco FUA makes all of these 20 benefits possible, at no material increase in cost!**

Actual production shows that Nopco FUA is the most outstanding self-fulling and self-scouring oil yet developed. For better wool processing, write for fully informative Nopco Data Bulletin.

NATIONAL OIL PRODUCTS COMPANY
BOSTON • HARRISON, N. J. • CHICAGO
CEDARTOWN, GA. • RICHMOND, CALIF.

NOPCO FUA
SELF-FULLING
SELF-SCOURING
WOOL OIL

NOPCO
EVOLVED THROUGH RESEARCH

—back in 1820: When it was costing two million dollars a year to guard Napoleon on St. Helena and there were less than a million and a half people in the whole of New York State—ten years after the erection of the first silk mill in the United States—John Butterworth established this business in Philadelphia to serve the Textile Industry. . .

For 126 years, our entire time and effort have been devoted to developing and building machinery for the Textile Industry . . . constantly helping to achieve greater speeds and lower production costs. We have watched the Textile Industry grow from a handful of family-sized plants to its present position as America's Second Industry. We are proud to have played a part in its development.

Butterworth Service includes a complete line of Machinery for bleaching, mercerizing, dyeing, drying, printing and finishing fabrics and warps: calenders for cotton and rayon fabrics: spinning machinery for rayon filament yarns.

Butterworth Research keeps informed on the new developments in Textiles and Textile-finishing. Butterworth Engineering strives to interpret each new development in terms of Machine Design and Plant Arrangement. Write us.

BUTTERWORTH

H. W. BUTTERWORTH & SONS COMPANY, Philadelphia 25, Pa.

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